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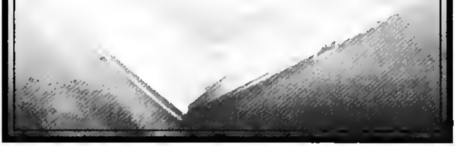

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THE FARM VALUER

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THE

FARM VALUER

BY

JOHN SCOTT

LAND VALUER

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1879

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PREFACE.

When we consider the great number and the many different kinds of Farm Valuations, the various purposes for which they have to be made, and the enormous amount of capital that is exchanged by that means annually, it is almost incredible that, in respect to many of the subjects, no general standard has been adopted for fixing the values. In common with many others, I have, in dealing with these subjects, often felt the inconvenience of this want of recognised principles; and having drawn up a few rules for my own guidance, in the first instance, I have been induced to throw them into the form of a small manual for the use of Land Valuers, Factors, Stewards, Estate Agents, and the still larger class of practical and amateur Farmers.

In this work my aim has been to reduce to something like a system the various methods of estimating value in Farm matters, and to treat each subject on a basis which will apply to the whole country.

As regards the Valuation of Land, the tables given in the first chapter will afford a clear view of the expenses incurred in arable farming at the present time, and of the proportion which exists between the value of produce and the amount of rent and expenses on such land. The tables, it will be seen, may be easily extended so as to apply to any class of soils or system of farming in whatever district; but they are put forward rather to show the present relations between Produce, Rent, and Expenses under given conditions, than to lay down an invariable rule. The Valuation of Grazings has been discussed with a minuteness of detail which, I hope, will supply all that has hitherto been wanting to make that branch of the subject fully understood.

The various matters of Hill Flocks, Tillages, Crops, and Manures, which are the frequent subjects of valuation between outgoing and ingoing tenants, are severally gone into, and the principles involved in the valuation of each of them fully explained. The abuses which prevail, through the tenacity of old-established customs, in many of these valuations, have also been adverted to and the remedies pointed out. If the need of correct principles to value upon can be greater in some cases than in others, it will be particularly noticeable in the valuation of tillages, and also that of hill flocks,—the latter a very large and important subject in the extensive hill districts of the country, but which, like many other valuations of the kind, it has been the custom to leave entirely to guess-work.

In respect to compensation for Unexhausted Improvements, Manures, and Feeding-stuffs, there is such an obvious advantage in having a general standard of valuation to go by, that, while fully aware of the danger of awarding compensation in such subjects on anything like a fixed rule, and while differing with many of the details of the 'Agricultural Holdings Act (England) 1875,' I have deemed it better for the present, to confine my remarks on these subjects to a practical interpretation of the application of that Act. The classification of the improvements that come within the Act might have been better. Some of the improvements in the first class, if well done, ought to last considerably more than twenty years, and others, again, might justly enough have been classed at less than twenty years. On other points the Act is not so clear and explicit as it might have been. Instead of drainage, for example, being classed under the two heads of 'under-drainage' and 'surface-drainage,' it is simply put under the one head 'Drainage of Land,' and classed at twenty years. But this cannot be intended to apply to surface drainage on hill lands, the average duration of which is only about eight years. Yet, however much fault may be found with the Act, it contains at least the germs of much usefulness, and the pity is that it should not have been more generally adopted.

The chapter on the Valuation of Stock-in-trade was, in point of fact, written in reply to a question put to me by a gentleman farmer, as to how he could best ascertain the net profit or loss on his farm; but it will be found of equal use to the practical farmer, the land valuer, and others.

J. S.

28 Gloucester Street, Regent's Park,
London, N.W.: *November* 1878.

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THE FARM VALUER.

CHAPTER I.

VALUATION OF FARMS.

While every farm or landed estate has a surface value, depending on soil, climate, situation, woods, and buildings, &c., it must not be forgotten that it may also have another and a second value, depending on the nature, abundance, and accessibility of the rocks and minerals below. From inability on the part of the purchaser or seller to estimate the capabilities in one or other of these directions, landed property is very often bought and sold much above and below its value.

In valuing a farm or estate for purchase or sale, therefore, next to a knowledge of practical agriculture, there is nothing more requisite than a knowledge of surface geology, and of the different rock formations, and a right understanding of the law of superposition of these rocks. The land surface may be worth only a few shillings per acre, but the presence below of coal, ironstone, iron pyrites, rock-salt, coprolites, slate, or building stone, may be worth as many thousands of pounds. Now, geology not only tells us where these are to be found, but it tells us just as truly where we need not expect to find them. Millions of money have been squandered in this country in the vain search for coal where geology has unfalteringly declared that no coal exists; while, on the other hand, many farms and estates have been sold for the mere agricultural value of their soils, the seller in total ignorance of the mineral value, which may have been worth most. As, however, it is more particularly the agricultural value that we have to do with here, it will be proper to dismiss other considerations for the present, with this brief general notice of their importance in land valuation.

Geology has at the same time a direct bearing on the surface value of land, although the benefits to be expected from it in this respect are somewhat lessened, owing to the rocks *in situ* being so often covered with drift and the *débris* of other soils. The composition and texture of soils, and the possibility of their improvement by admixture, and drainage, and the application of manures, are all dependent in a great measure on the rock formations that formed these soils, and that underlie them.

The chemical analysis of soils has not hitherto received the attention it merits. Yet a rigid analysis of a soil is not to be implicitly relied on. Soils differ not only in their composition, but their composition varies with, or is affected by, a change of seasons and many other causes. Thus, the surface soil of a field, if at all sandy or porous, will generally contain a greater amount of soluble inorganic matter in the middle of a hot dry season than in one of even ordinary rain; and for such-like reasons a general analysis of a soil is seldom reliable. But chemical analysis is still of great importance in connection with soils in seeking out any one of the constituents, as the quantity of organic matter, lime, or potash, &c.

In the absence of a rigid analysis, the classification of soils should be made as simple as possible. Soils being made up chiefly of sand, clay, lime, and organic matter, these four constituents may be taken as types of all our various soils. Those containing 75 per cent. and upwards of silica should be classed as silicious or sandy soils; those containing 66 per cent. and upwards of silicate of alumina (clay) should be classed as argillaceous or clay soils; those containing 50 per cent. and upwards of carbonate of lime should be classed as calcareous or lime soils; and those containing 33 per cent. and upwards of organic matter should be classed as vegetable soils. From these four we may deduce every other variety of soil. Thus:—

Sand + clay = a loam
Clay + lime = a marl
Sand$_2$ + clay = a sandy loam
Clay$_2$ + sand = a clay loam
Clay$_2$ + lime = a clay marl
Lime$_2$ + clay = a calcareous marl
Sand + vegetable matter = a light vegetable soil
Clay + vegetable matter = a heavy vegetable soil
Lime + vegetable matter = a calcareous vegetable soil.

In a fertile soil, the organic matter, the sand, clay, and other bulky constituents are so proportioned that none of them prevail to an excessive amount, while the more valuable mineral constituents are present in appreciable quantity, and no substance occurs to injure or retard vegetation. Fertility also depends on certain properties of texture, as depth, looseness, and uniformity. Infertility may be caused by the presence of some substance hurtful to vegetable life, such as mineral acids, stagnant water, or an excess of some otherwise useful material, or by the absence of some of the necessary food constituents of plants, or from such causes as bad mechanical texture.

The indigenous plants often afford a good index to the character of the soils on which they are found growing, and of their fitness for agriculture, and should be taken careful note of; but this view should embrace not merely the kind of plants, but the luxuriance or debility of their growth, and the early or late period of the season at which they mature annually. The oak thrives best in a deep rich clay; the ash likes a soil more dry and porous; the hazel a dry rich loam; the beech a shallow soil of the lime formation; and the thorn a dry strong loam. Wherever that injurious weed coltsfoot is found growing, it indicates a thin ill-cultivated soil, and the sure presence of lime below the surface. Rushes indicate a wet clayey soil; the dock an inferior soil of the sour stiff kind; the nettle a soil of a dry loamy description; the thistle a good corn-growing soil; the corn marigold and the corn poppy open and dry soils; the daisy and white clover fertile soils, somewhat cohesive and calcareous; spret a spongy soil; fern a dry fertile loam; sandwort a sandy soil; ragweed a good, dry, friable loam; while chickweed and natural clover indicate soils in high fertility. Mosses do not grow on the best and richest soils, but on all others they soon appear if left in grass—the less rich the soil the sooner the mosses appear on it.

To go a step further in this direction, the appearance of the crops on arable land, and the appearance of the grasses on pasture land, may be taken as a guide, rather than the wild plants seen growing on the lands, especially as a criterion of *condition* of soil; but while the growing crops are to be looked to in considering the rental value, they are not so much to be relied on in forming an estimate as to the purchase value of the land.

The physical character of soils cannot be judged of when the ground is soaked with rain, scorched by drought, or covered with frost and snow, nor when it is under a straw or other long crop. The best time for this examination is in the dry spring weather, when all the varieties of soil are exposed to view, and the proportion of good and bad, and of wet and dry, soil on the farm can be fully reckoned up. But for merely ascertaining the farming condition of the soil as to fertility, the best time for inspection is just before harvest, when the crops are coming to maturity.

In valuing a farm for rent, each enclosure should be examined separately, and an estimate formed of it in its existing condition, taking into account its capabilities for improvement. Then, the particular rent being fixed, we arrive at the gross rent, and the average rent per acre, over the whole farm.

The chief considerations, in making the valuation, are:—

1. The nature and condition of the soil.
2. The situation, aspect, and exposure of the lands.
3. The cost of working the farm.
4. The burdens on the occupier.
5. Are the buildings and fences &c. suitable?
6. Is the farm to be let on lease, and, if so, on what conditions?

The best land to rent is rather strong land, that does not want draining. The higher in condition it is the better, and a high rent for good land in good condition is always cheaper to a farmer in the end than a low rent for bad land or land out of condition. Bad land is never cheap to farm under any circumstances. It costs as much to work as good land, and sometimes even more, and is less certain to deal with, while it yields less produce, and a far smaller margin for profit. Then land in poor condition is a tedious thing to bring round again, and often costs 5*l.* or 10*l.* an acre in the process, which will take at least 5*s.* or 10*s.* an acre off the rent it would otherwise afford. At the same time there may be good farming on bad soils, and bad farming on good soils, and the temporary effects in either case have to be duly weighed in judging the value of the land.

The cost of working the farm will depend materially on the texture of the soil, and on the steepness or levelness of the ground, but also on the situation in regard to labour, markets, and general accessibility, and on the crops and system of farming best suited to the soil and the district. The burdens on the land—tithes, rates, and taxes—are often a large item in the cost of working, the tithe alone on some lands being equal to the rent. The amount of the burdens can always be ascertained to a nearness, and, therefore, if the working expenses are calculated, and the two added together, the difference between their amounts and the value of the produce will be the sum left for rent.

The rent ought to be calculated on the supposition that the farm is sufficiently provided with buildings, fences, and roads, and that these are in good condition, and when there is a want of the requisite conveniences, or they are not in a suitable state, a deduction must be made accordingly, unless it is understood that the landlord will provide the additional accommodations necessary to the proper and successful working of the farm. Temporary repairs, of course, that have to be done by the outgoing tenant, do not affect the rent.

There are certain conditions that decrease the natural rent of land, and certain other conditions that increase it. We have already named two of the former —bad condition of soil, and a want of the necessary buildings, fences, &c.—but there is a third, viz., the amount of valuations at ingoing, for tillages and other things which it is not essential to the new tenant's success that he should purchase on entering to the farm. He loses the use of so much capital which he could better employ, and the use or rather the laying by of this capital means a shilling or two per acre less rent. On the other side, there are three circumstances that increase the rent of land. If a farm is let on lease, it will always give a higher rent than if let on annual tenancy, and the same applies when the tenant has freedom of cultivation, and when he is assured of compensation for improvements in the event of his quitting the farm. The increase in rent can in few cases be put at less than *5s.* an acre for each of the three, making a total increase of 15*s.* an acre, and which, it may be affirmed, would add from one-third to one-half their present value to the general rental of landed estates. The tenants in such cases will often expend 10*l.* or 12*l.* an acre on improvements in the course of a short lease, and this cannot be done without improving the letting value of the land, which is by this means alone sometimes doubled during a single lease.

As there are certain fixed expenses which have to be met before land can afford a rent, it may be well to glance at these expenses, and consider what share of the produce has to be set apart for them at present in farming arable land. We assume it to be land of medium quality, but well farmed, and employing an ordinary farming capital of 10*l.* an acre. The days' wages of a man are taken at 3*s.*, and the daily cost of

	4-Course										5-Course						6-Course						
	Heavy soils					Light soils					Intermediate soils						Intermediate soils						
	Wheat	Roots	Oats or barley	Clover, mown	Total	Wheat	Roots	Oats or barley	Clover, mown	Total	Oats	Roots	Oats or barley	Clover or grass, mown	Grass, grazed	Total	Oats	Roots	Oats or barley	Clover or grass, mown	Grass, grazed	Grass, grazed	Total
Produce per acre, expressed in shillings .	176$\frac{7}{12}$	186	150$\frac{7}{12}$	122	635$\frac{1}{6}$	165$\frac{1}{4}$	183$\frac{1}{2}$	147$\frac{1}{4}$	122	618	149$\frac{11}{12}$	221$\frac{1}{3}$	149$\frac{11}{12}$	126	92	739$\frac{1}{3}$	149$\frac{11}{12}$	231$\frac{1}{3}$	149$\frac{11}{12}$	126	92	92	841$\frac{1}{3}$
Expenses per acre, expressed in shillings :—	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Manual labour	25 10	31 6	25 10	10 0	93 2	24 9	31 6	24 9	10 0	91 0	25 3	31 6	25 3	10 0	1 6	93 6	25 3	31 6	25 3	10 0	1 6	1 6	95 0
Horse labour	17 9	37 6	17 9	3 0	76 0	15 6	27 0	15 6	3 0	61 0	16 8	32 0	16 8	3 0	—	68 4	16 8	32 0	16 8	3 0	—	—	68 4
Seed	12 0	4 0	14 0	16 0	46 0	12 0	4 0	14 0	16 0	46 0	15 0	5 0	15 0	20 0	—	55 0	15 0	5 0	15 0	20 0	—	—	55 0
Purchased manure . .	28 0	20 0	—	—	48 0	20 0	28 0	—	—	48 0	—	60 0	—	—	—	60 0	—	70 0	—	—	—	—	70 0
Tradesmen	2 6	2 6	2 6	2 6	10 0	2 6	2 6	2 6	2 6	10 0	2 6	2 6	2 6	2 6	—	10 0	2 6	2 6	2 6	2 6	—	—	10 0
per cent. Risk 10 Interest 5 Farmer's profit 5 } on 10*l.* per acre of capital	40 0	40 0	40 0	40 0	160 0	40 0	40 0	40 0	40 0	160 0	40 0	40 0	40 0	40 0	40 0	200 0	40 0	40 0	40 0	40 0	40 0	40 0	240 0
Expenses of whole rotation	—	—	—	—	433 2	—	—	—	—	416 0	—	—	—	—	—	486 10	—	—	—	—	—	—	538 4

a horse at 3*s*. 4*d*. The result will be best given in a tabular form, showing the proportion of expenses to produce on heavy, light, and intermediate soils, respectively, when farmed on different rotations.

The balance of produce, over and above expenses, is the sum left to pay rent, rates and taxes, and tithe, if any. In the preceding table, this balance will on working out be found to be 50*s*. 6*d*. per acre per annum, in each case. If, therefore, the rates, and taxes, and tithe were found to be 10*s*. 6*d*. per acre, the net balance of 40*s*. per acre would remain for annual rent.

This will be seen from the following summary of annual produce and expenses:—

	4-Course		5-Course	6-Course
	Heavy soils	Light soils	Intermediate soils	Intermediate soils
Average annual produce .	158¾	154½	147⅚	140⅙
Average annual expenses per acre, in shillings—				
Manual labour . . .	23¼	22¾	18⅔	15⅚
Horse labour	19	15¼	13⅔	11⅓
Seed	11½	11½	11	9⅙
Purchased manure . .	12	12	12	11⅔
Tradesmen	2½	2½	2	1⅔
Risk, interest, and farmer's profit . .	40	40	40	40
Total annual expenses per acre	108¼	104	97⅓	89⅔
Rent, rates and taxes, and tithes	50½	50½	50½	50½

In order that it may be perfectly clear how the above estimates of labour were arrived at, we here give our calculation of the manual and horse labour required per acre on a corn crop and on a root crop, on light and heavy soils, respectively, and on which our table of expenses was based:—

	Root Crop				Corn Crop			
	Day's work of a man		Day's work of a horse		Day's work of a man		Day's work of a horse	
	Heavy soils	Light soils	Heavy soils	Light soils	Heavy soils	Light soils	Heavy soils	Light soils
Autumn ploughing . . .	1·25	1·	2·50	2·	—	—	—	—
Spring ploughing . . .	1·	—	2·	—	1·25	1·	2·50	2·
Cultivating	·50	1·	1·	2·	—	—	—	—
Harrowing	1·50	·75	3·	1·50	·50	·40	1·	·80
Rolling	·50	·20	1·	·40	·10	·10	·10	·10
Dung cart	1·	1·	1·	1·	—	—	—	—
Dung spreading	1·	1·	—	—	—	—	—	—
Sowing artificial manure .	—	·20	—	—	—	—	—	—
Ridge ploughing	—	·25	—	·50	—	—	—	—
Sowing seed on ridge . .	—	·20	—	·20	—	—	—	—
Drilling seed and artificial manure	·25	—	·25	—	·20	·20	·20	·20
Singling	2·	2·50	—	—	—	—	—	—
Hoeing	1·50	2·50	·50	·50	—	—	—	—
Reaping	—	—	—	—	·15	·15	·30	·30
Tying and stooking . . .	—	—	—	—	1·	1·	—	—
Pitching, carting, and stacking	—	—	—	—	1·25	1·25	·75	·75
Thatching	—	—	—	—	·33	·33	—	—
Threshing	—	—	—	—	2·	2·	·50	·50
	10·50 3	10·50 3	11·25 3/4	8·10 3/4	6·78 3	6·43 3	5·35 3/4	4·65 3/4
					20/4	19/3		
N.B.—Add 5/6 per acre extra wages for manual labour at harvest time .					5/6	5/6		
	31/6	31/6	37/6	27/0	25/10	24/9	17/9¾	15/6

It used to be an old saying that arable land had to make three rents—one for the landlord, one for the farmer, and one for labour and charges. But all this is altered, and from three and a half to four rents have now to be made in order to pay one—labour and charges alone taking from three-sevenths to one half of all that arable land produces. Rent and expenses have of late years, we think, both gone up more than the increase and price of produce. Still, neither rent nor wages are likely to become permanently lowered, and if such a thing was to happen, it would betoken nothing less than a national calamity. Land is a limited quantity in this country, and the more that wealth and population accumulate, the greater will be the increase in the value of land, both to purchase and rent.

As an investment, land usually offers a rather lower rate of interest than the money market. The purchase value of a farm or estate is, however, regulated by many other things besides the current rate of interest. In some counties there is more competition for land than in others, the situation and desirability of the property for residence being the chief influence here; but, in addition, the value of land depends on the acreage, the quality of the soil, its state of cultivation, the capabilities for improvement, what burdens are on the property, and whether the buildings are good and sufficient, and if there are any woods and minerals, if it affords good shooting and fishing, and on the amount of the rental. The net rental is the real groundwork on which to fix the value. In the case of freehold land this varies, according to circumstances, from twenty-five to forty years' purchase of the net rental, which, to make allowance for landlord's burdens and repairs, should be ten per cent. less than the gross rental. The value will, therefore, be found by multiplying the net rental by the number of years' purchase which the property will bear. For example, if the gross rent of a farm is—

	£1,000
Deduct 10 per cent. for landlord's repairs and burdens	100
And the net rental will be	£900

Then, supposing the farm is bought to return 3½ per cent. on the purchase money, that will be $28\frac{4}{7}$ years' net rental, or 25,714*l*. If any part of the property is let on lease at an inadequate rent, a deduction must be made from the price, equal to the deficiency of annual rent multiplied by the number of years the lease has yet to run. The number of years' purchase, at different rates of interest, is shown in the following table of perpetuities:—

A perpetuity at	1	per cent.	is worth	100	years' purchase
,,	1½	,,	,,	66·666	,,
,,	2	,,	,,	50	,,
,,	2½	,,	,,	40	,,
,,	3	,,	,,	33·333	,,
,,	3½	,,	,,	28·571	,,
,,	4	,,	,,	25	,,
,,	4½	,,	,,	22·222	,,
,,	5	,,	,,	20	,,
,,	5½	,,	,,	18·181	,,
,,	6	,,	,,	16·666	,,
,,	6½	,,	,,	15·384	,,
,,	7	,,	,,	14·285	,,
,,	7½	,,	,,	13·333	,,
,,	8	,,	,,	12·5	,,

A perpetuity at 8½ per cent. is worth 11·764 years' purchase.
„ 9 „ „ 11·111 „
„ 9½ „ „ 10·526 „
„ 10 „ „ 10 „

The best land to invest in is that which is capable of improvement. It fetches less than land that is in high condition, but it is worth more to the buyer. Money laid out on improvements will return from 5 to 20 per cent., while only about 3½ per cent. can be obtained on the land itself. Unimproved land is therefore both safer and more profitable to purchase than improved land of equal quality, for, in addition to the interest on the original purchase money, the improver gets the higher percentage on the outlay on improvements, and the latter will frequently double the original value at a great profit. Supposing a farm in a neglected state is bought for 25,714*l.*, yielding 3½ per cent. on the purchase, or 900*l.* of original rent, and that 5,000*l.* laid out on improvements yields 10 per cent., the improved rental will be 1,400*l.* But the improved rental capitalized at 28$\frac{4}{7}$ years' purchase, to return 3½ per cent., as in the original case, will be worth 40,000*l.*, and as the total cost of the farm, including the 5,000*l.* laid out in improvements, was only 30,714*l.*, the net profit is 9,286*l.*

CHAPTER II.

VALUATION OF GRAZINGS.

The general considerations on land valuation which have been stated in the foregoing chapter must be held to apply equally here. But the valuation of grazings has further to be separately considered. Sheep farming of the class pursued on the hills is a special business altogether, and many good judges of arable land and of arable farming would be utterly at fault if asked to put the value on a lowland sheep farm or a highland grazing. To estimate the amount of produce a sheep farm can send to market, and the value of that produce, to know exactly the expenses incurred and the risks run by the farmer in bringing that stock to market, and what amount of capital requires to be laid out in stocking the farm, is what a mere acquaintance with arable farming does not qualify any one to do.

The rent of sheep land is usually fixed on the number of stock the grazing will maintain. Nominally it is said to be calculated on the grass-meal or rent per sheep, but the more correct way is to find the gross rent first and then the sheep rent. If the number of sheep is not known, the valuer must determine that point for himself, according to the extent and quality of the grazing. The next thing is to compute the saleable produce and the expenses and risks of management. This involves a close inspection of the grazing, as to the quality and healthiness of the pastures, the supply of food at all seasons of the year, the exposure of the ground, the conditions of climate and shelter, the distance from markets, and the state of the lands as to drainage and fences.

During the last twenty years grazing rents have risen two or three shillings per sheep; in some instances a good deal more. Nine shillings per sheep is now about the average rent in the south, but there are grazings rented as high as twelve shillings per sheep, and even more than that on strong good land. On many of the lowland sheep farms, however, a few fields of good arable land go along with the hill, and it is not unusual to reckon these in the lump, and so saddle the whole rent on the sheep land. The grass-meal in such cases is less than it is said to be. If any arable land is attached to the grazing it is best to have it valued separately at what it is worth as arable land, and to make it a second item of rent.

The natural conditions of soil, of grasses, of climate, and exposure are all of the first importance in estimating the value of sheep lands. It is the land that makes the sheep, and on the nature of the soil, on the kinds and varieties of the grasses, on the conditions of climate, may be said to depend the weight and quality of both sheep and wool, also the liability of the sheep to disease, and whether food will be abundant or scarce at the proper seasons. The exposure or lay of the farm is not of less consequence, for some grazings are far more easily stormed than others, and it is a great advantage when the stock is well sheltered from the cold winds.

Although, in the valuation of grazings, acres and measurements are looked on as secondary considerations to the number of stock the ground will carry, it should always be an object to ascertain the exact extent, proportion, and character of each variety of surface land and herbage, such as mosses, heaths, bogs, bents, fine dry pasture, barren rocks, and woods, &c. When no map of the farm denoting these surface varieties is to be had—and there are too few of them in use—the valuer must estimate the quantity of each in his own mind, unless a special survey is gone into. When he knows the acreage and the proportion of the different kinds of herbage, he is more likely to form a correct estimate of the value of the grazing as a whole. With greater attention to this there would be fewer mistakes in stocking a grazing, both as to the numbers it will support and the class of sheep best suited to it.

It is on deep grassy bog land that we find the biggest sheep and the heaviest fleece. This kind of pasture occupies the strong soils, found sometimes covering the gentle slopes, but more commonly surrounding the bases and filling the hollows of the hills. It abounds in spret and finer grasses, which are fed by sheep in winter as well as summer. The bogs in their abundance also yield hay for winter foddering, a most essential thing on a hill farm, especially if it lies in a high district. Then again, on ground of this class, there are fewer deaths and fewer barren ewes in the flock, the produce is greater, and fetches a relatively higher price, and fewer lambs are required to keep up the stock than on any other kind of hill pasture.

Moss ground lies chiefly on the hill tops, or on the higher plains of the moors. It is of most value when low down on the hills, for then the sheep can reach it with more ease in hard and stormy weather. It makes but a light sheep, and is best when mixed with grassy land; but sheep are not easily wintered on the hills if there is no moss ground. This kind of soil produces moss in spring, deer-hair in summer, and ling which grows all the year round. Moss and ling are invaluable for hill pastures in spring. Sheep do not crop them as they do other plants, but draw the stalks out from the roots. Bent land also yields some excellent grasses of a coarse kind. The two chief varieties are stool-bent and white-bent. The former is an evergreen, and more valuable than the latter, which dies off in autumn. Fine dry pasture land only affords summer grazing. Heath grows on almost every kind of soil; but moss heather is best for sheep. Not only the proportion of heather on the grazing requires to be well seen to, but the proportion of old and young heather. Sheep, like birds, only eat heather in its young state, and the value of many moors is greatly lessened for sheep-farming by an undue proportion of old heather.

A hill grazing is valuable, more or less, according to its proportion of these soils and pasture plants. A good summer pasture is, of course, an essential thing in any case, but where the pastures produce only summer grasses the flock is not so easily wintered, and the sheep for the most part come out poor in spring. A grazing with the soil and pasture all of one kind is seldom to be met with, and as seldom to be desired. Grassy or bog land alone, of itself, will grow good sheep, and keep them in condition throughout the year. The value of every other variety of hill pasture depends a great deal on its being of a mixed character.

Neither must the artificial conditions of drainage, of fences, of shelter, and the accommodations necessary to store-farming be overlooked. If the sheep-drains are not open, or if there are not enough of them where the land is wet, the cost of opening old drains and making new ones will have to be considered. It is likewise a great matter to have a sheep farm enclosed with a good march fence—if a dyke or stone wall, so much the better, as it affords a long line of shelter from different points. When there is no boundary fence, the herding is not so easy, and the pastures are not so fully and equally fed down, and, therefore, less stock is kept; besides which, sheep never do so well when constantly disturbed as when they are left to feed at ease. Artificial shelter is not always to be found where it is wanted, and the presence or absence of it should be taken into account. Then, as to the accommodations which specially appertain to a hill grazing: there must be one or two fields fenced off the hill, and a few paddocks in them; there must be a sheep-fold for sorting the flock in; and there must be a washing-pool, or a stream on the farm that will make one. None of these cost much to provide. There must also be a wool-house, together with dwellings for the shepherds, &c.

If the foregoing data has been taken with care, the valuer will then be in a position to proceed with his calculations. In determining what number and class of sheep the grazing will best support, there is no general rule to go by, as what suits one farm will not suit another: but the chief thing is, not to put on too many, nor to put on bigger sheep than the land is fitted to carry. Irremediable mischief has been worked in many hill flocks by trying to get the sheep too big, especially on hard land.

By way of illustrating figures: suppose, now, that it is a lowland grazing of about an average character that we are valuing, and that it carries a breeding flock of 1,200 Cheviot sheep, besides affording grass and hay for the shepherd's cows. Of these 1,200 sheep, one-fifth, or 240, would be ewe hoggs, and the remaining 960 would be breeding ewes of four different ages in equal number of 240 each—say, 860 ewes and lambs, and 100 eild ewes and gimmers. At a Whitsunday valuation, which is the usual time of entry to farms of this class, the value of the stock, at present rates, would be about 32*s.* for the ewe hogg, 54*s.* 6*d.* for the ewe and lamb, and 40*s.* for the eild ewe or gimmer. There would be required further, 20 rams at, say, 3*l.* each; and allowing 32*l.* 10*s.* more for utensils, the total cost of stocking the grazing would amount to 2,820*l.*

The annual sales from such a grazing, after making allowance for loss or mortality, and for 240 top ewe lambs kept to make up the flock, would probably be—

620 lambs
160 draft ewes
170 stones of wool
80 skins.

The expenses of management being less on sheep land, it pays a greater proportion of the produce to the share of rent than in the case of arable land. The expenses, however, depend to some extent on the breed of sheep, and on the character of the grazing. For a Cheviot ewe stock of 1,200, two shepherds will be required, with extra hands at lambing, clipping, dipping, haying, and other times. Then there is the cost of sheep dip; the cost of extra food for wintering the rams; the expenses of cleaning out drains, and of keeping up fences and buildings; market expenses and commissions; parish rates; interest on capital, and farmer's profit.

Putting down both sales and expenses at the present average rates for such a grazing, they would show as follows:—

	£	s.	d.	£	s.	d.
Amount of sales				1029	10	0
170 stone of wool, at 35*s.*	297	10	0			
80 skins, at 4*s.*	16	0	0			
140 draft ewes at 35*s.*	245	0	0			
20 shotts do. at 25*s.*	25	0	0			
300 top wether lambs, at 15*s.*	225	0	0			
140 second do. at 11*s.*	77	0	0			
120 second ewe lambs, at 20*s.*	120	0	0			
60 small ewe and wether lambs, at 8*s.*	24	0	0			
	£1029	10	0			

	£	s.	d.	£	s.	d.
Expenses				452	13	0
Two shepherds, at 45*l.*	90	0	0			
Extra hands	20	0	0			
Sheep dip	7	0	0			
Wintering rams	10	0	0			
Cleaning 1,500 rods of drains	6	5	0			
Repairing fences and buildings	6	0	0			
Market expenses and commissions	20	0	0			
Parish rates	11	8	0			
Interest on 2,820*l.* at 5 per cent.	141	0	0			
Farmer's profit at 5 per cent. on capital	141	0	0			
	£452	13	0			
Rent afforded by the grazing				£576	17	0

This brings out the rent at about 9*s.* 6*d.* per sheep. The figures are fairly given for a grazing of that class, according to the times. Wool is set down a little higher than its present price perhaps, but it is exceptionally low just now, and while the clip sometimes averages more than 5*s*. per sheep, it is not often less. The price put on the second ewe lambs is moderate when we look at the way they have sold for some years past. The difference between the number of draft ewes sold and the number of ewe lambs kept for stock shows the loss or mortality in the flock, which in this case is assumed at 6·6 per cent., and is certainly not overstated, but it varies with the grazings.

It may be noted that nearly five money rents are here invested in stocking the grazings, or, in other words, the stock is worth about five rents. In like manner, it will be observed that the annual expenses, including interest and farmer's profit, amount to 7*s*. 6*d*. per sheep—about 2*s*. 10*d*. per sheep being actual working expenses, and 4*s*. 8*d*. per sheep being farmer's profit and interest on capital.

On Highland grazings, sheep-farming is a more speculative business, and the rents are lower. The death-rate is higher, wintering is more expensive, and the produce both in lambs and wool is less. The hoggs are, for the most part, sent away to winter on low ground, at a cost of about 6*s*. per head. Where ewe flocks are kept, the ewes are left on the hill all winter, but often to get very reduced in condition before lambing time. Even black-faced wethers, however, cannot stand the winter on some of the higher ranges, and have all to be removed from the hill.

The best grazings do not quite carry a sheep an acre all round, indeed, the majority require two or three acres to a sheep, and some a great deal more than that even. In the South the grazings vary in extent from 600 to 4,000 sheep, and in the North from 2,000 to 8,000, or sometimes as many as 12,000 sheep.

The number of years purchase which estates of this class realise is from 25 to 33, according to the situation and amenities of the property, much depending on the shooting and fishing the estate affords, and whether there is a good summer residence or not.

The undeveloped condition of most of these grazings cannot be better expressed than by saying that there are millions of acres of such land rented at not more than 1*s.* per acre. The most extensive estate in the kingdom, which embraces one and one-third million acres itself, is rented to-day at an average of only 1*s.* 0½d. per acre, and it is no solitary exception.

Nothing, as a rule, has yet been done to make this class of farming more productive, but rather the reverse. Sheep and lambs and wool are raised and carried off the land annually, without the least return being made to the soil in the shape of manure—and this gradual process of waste has in many cases now been going on for centuries, since sheep-farming was first introduced. It is the opinion of many who are well qualified to give an opinion on the subject, that these lands would pay well for increased attention. Not to mention such improvements as draining and liming, for which a great part of these grazings is waiting and well adapted, a vast deal might be done in top-dressing such parts of the land as would pay for it with bones and other more stimulating manures, and in hand-feeding hill sheep in winter with cake and corn, which food suits hill stock, even the hoggs, far better than turnips, when the turnips cannot be given regularly every winter. The extra growth of grass feeds the land, while it keeps more sheep, and keeps them better. If only one quarter the expense that is usually bestowed on arable lands was bestowed here, it would give far better results, because a smaller increase here would suffice to double, and more than double, the numbers of stock kept and the rents paid.

CHAPTER III.

VALUATION OF HILL FLOCKS.

On the hill grazings, where a system of store farming is pursued, an outgoing tenant is, in most cases, bound by his lease to leave the regular sheep stock of the farm to his successor at valuation price. Even where it has not been stipulated for, this arrangement is generally adopted throughout these districts.

The practice is one that commends itself to all parties concerned, for various reasons. It insures the outgoing tenant a customer for his stock, and it gives the incoming tenant a fixed stock with the farm. Much of the success of store farming depends on the last-named condition. If the acclimatised stock of a farm of this description is scattered, it is all but impossible to at once get together again a fresh stock equal to it in all the different ages and proportions; and, supposing it could be got together, the chances are that the new stock, as regards size and constitution, would not be half as well adapted to the grazing as the one that was bred and reared on the farm. There is also the risk of a serious loss by bringing a fresh stock on to land that is liable to disease. And it must not be forgotten that, on these wide and open ranges, old sheep, if sent to a strange run, never settle, but continue to stray and wander off it.

It is another matter, however, to say what these advantages are worth in a money consideration. The new tenant has an undoubted right to as favourable an incoming as possible, and it is for the encouragement of sheep farming as an industry that it should be so. On the other hand the outgoing tenant is entitled to full value for the stock he is parting with, but not to more than its value. The stock may be said to belong to the farm by the lease, and, if a tenant was valued in when sheep prices ruled high, he must all the same take his chance of the prices that are going when he goes out again. The only rule to go upon is that of honesty and fairness, and the endeavour should be to hold the balance even between both parties.

A hill flock is usually valued at Whitsunday, that being the common time of entry to grazing farms. At first sight it might appear that an autumn valuation at Michaelmas or at Martinmas would be best, as that is the time when the flock is made up for the winter, and there would be no surplus stock to take to. But a spring outgoing at Whitsunday or at Ladyday gives a tenant who is quitting a stock farm a better cast; and that term is also best for an incoming tenant. The autumn valuation would be less to begin with, it is true, but then there are no sales or returns from the store farm during the winter half-year; whereas, a spring valuation, though higher, is soon followed by the summer sales of wool, lambs, and draft sheep. Another thing in favour of a spring entry is, that the new tenant has the summer before him to provide a store of hay for the winter; but, if he enters at the autumn term, a winter's hay has to be paid for, or the sheep must go without it.

The general custom in the South is to fix the price at the time the stock is delivered to the incoming tenant, and usually a discount of 2½ per cent. is allowed for cash payments. In the Highlands the practice is somewhat different: the valuers meet and inspect the stock at the time of delivery, but do not fix the prices until after the following summer sales, or they do so on a calculation of what it would fetch in the autumn markets. This may give rise at times to an exorbitant valuation. The incomer, it must be remembered, has to take all risk of the stock from the day of delivery, and it is fed and tended at his expense all the summer,—two facts which ought to be regarded in the light of deductions. On the other hand, when the price of young breeding stock is based on that of the annual cost of ewes and lambs and wool, the difference in favour of the incoming tenant may be more than he is entitled to, in order to cover all risk and the cost of the summer's grass. Reference to autumn prices may more properly be allowed in the case of wether stocks, which go into the market then, and the value of which is more dependent on the turnip crop, and cannot therefore be so easily determined at Whitsunday, as that of breeding stock.

The principles on which the price of store stock is fixed are of the vaguest kind, notwithstanding that a vast amount of this description of property changes hands by valuation every year. The elements of value are simple and tangible enough, compared with some other subjects of valuation; yet no general standard or method of fixing the value has been adopted in stock valuations.

Now, it is evident that the value of the stock to the incoming tenant is just what it would be worth to its present owner, if there was not going to be any change, allowing for losses, rent, interest, and all expenses. Young store sheep, such as ewe hoggs, and also breeding ewes, have, therefore, to be valued prospectively, and taken at their average produce in wool and lambs for the years they will be in the flock, with their future price as drafts, and making the necessary deductions.

The present and prospective value of a breeding flock may be worked out in the following way—supposing it to be an average Cheviot stock at the present time, the data for such a calculation having been sufficiently established in the preceding chapter on grazings to be accepted here without again going into the details connected with that part of the subject:—

PRESENT AVERAGES AND PRICES IN A FLOCK OF 1,200.

	s.	d.
Lamb	14	6
Draft ewe	33	9
Fleece	5	0
Rent per sheep	9	6
Expenses per sheep	7	6

Now the flock was shown to consist of five different ages:—

Ewe hoggs	240
Two-year-old ewes or gimmers	240
Three-year-old ewes	240
Four-year-old ewes	240
Five-year-old ewes	240
	1,200

The ewe hoggs will thus be five years in the flock before they fall to be drafted, and in that time each of them may be expected to produce five fleeces, four lambs, and finally the price of the draft ewe; from which, however, there have to be deducted five rents and five expenses, and then the balance is the net present value of the ewe hogg. Similarly, the two-year-old ewe, or gimmer, will be four years in the flock, and will produce four fleeces, four lambs, and the price of the draft ewe, less four rents and four expenses; the three-year-old ewe will be three years in the flock, and will produce three fleeces, three lambs, and the price of the draft ewe, less three rents and three expenses; the four-year-old ewe will be two years in the flock, and will produce two fleeces, two lambs, and the price of the draft ewe, less two rents and two expenses; and the five-year-old ewe will be one year in the flock, and will produce one fleece, one lamb, and the price of the draft ewe, less one rent and one expenses.

The Whitsunday value of the stock of different ages would therefore, on the above data, be:—

	s.	d.
Ewe hogg	31	9
Two-year-old ewe or gimmer	43	9
Three-year-old ewe	41	3
Four-year-old ewe	38	9
Five-year-old ewe	36	3

The value of the average ewe and lamb is found by taking the average value of the four ewes of different ages, and then adding the price of the lamb—

		s.	d.
		43	9
		41	3
		38	9
		36	3
	4)	160	0
Average ewe value		40	0
Add price of lamb		14	6
Value of ewe and lamb		54	6

The proof of the above rule is, that the difference between the value of the two-year-old ewe and the three-year-old ewe, or between the three-year-old ewe and the four-year-old ewe, or between the four-year-old ewe and the five-year-old ewe, is just the difference between the value of the five-year-old ewe and the price of the draft ewe. The same amount is, of course, the difference in value between the lamb and fleece, and a year's rent and expenses. It will further be observed that the value of the average ewe, and of the ewe and lamb, works out exactly to the price at which they were valued on the tenant entering to the grazing. The ewe hogg was valued at 32*s.* at ingoing, and its actual proportionate value is here seen to be 31*s.* 9*d.* For the ewe hogg to warrant a higher price, the rest of the flock would also have to be proportionately of higher value, and the value of both lamb and fleece would have to be greater in proportion to the rent and expenses. Yet we commonly find that where the ewe and lamb are worth no more than 54*s.* 6*d.*, the ewe hogg is valued as high as 36*s.* This is done presumably on the ground that the hogg will clip more wool than the ewe, which is true enough; but in dealing with a flock we have to take the average clip of young and old together for the value of the fleece, and if the older ages are valued on that average, the ewe hogg is not worth more than its actual proportionate value. If the ewe hoggs are sold separately, and not with the ewes, then the two should be valued separately, but not otherwise.

In these calculations, no addition is made to the price of the lambs—the average price of lambs sold that is—on account of the 240 top ewe lambs kept for stock, and which, if sold, would have fetched about 10*s.* a head more than the other lambs: because the whole saleable produce is already included without that addition; neither is there any deduction made for loss and mortality in the flock, which was shown to be 6·6 per cent.; because the expenses already charged include the farmers' profits, which, of course, are over and above the deductions that have to be made of every kind.

The value of a wether flock is calculated on the same principle as that of a breeding flock. The different ages are reckoned at the produce of each in wool and mutton, according to the grazing and the sheep it will make, and deducting the necessary rent and expenses.

The value of draft ewes, lambs, and wool, which, in calculating the present and prospective value of a breeding flock, was taken at an established price, is much easier to ascertain, as the market rate of each is always well known. The draft ewes, however, may be estimated in the same way as a wether stock, at their value in wool and mutton, either at fat price or at what they are worth to fatten.

CHAPTER IV.

VALUATION OF TILLAGES.

Almost every kind of labour that is performed on a farm is at times the subject of valuation between outgoing and incoming tenants. The various works of tilling the land, of seeding it, of applying manures, of crop culture, and the ultimate operations of reaping, threshing, ingathering, and storing the produce, have all to be dealt with, in their many aspects.

The main difficulty in estimating tillages, is in the case of fallows, and where crops have to be taken over at what it has cost to produce them, as the question is not then always one of simply paying for visible results. The system of compensation for fallows, and especially for other than clear and full fallows, is a bad one altogether, for the incoming tenant is very often thereby called on to pay for what he does not get, or for what does not benefit him in the remotest degree. The best plan is to treat fallows in the same way as other tillages, and to pay only for tangible value, and only where the land has had a clear fallow, and has not since borne a crop. It is all very well to cry up the beneficial influence of a fallow, but fallowing is not so lasting in its effects as is generally supposed, and fallow-farming is always poor farming, and the land in want of manure. On the very heaviest of the weald clays, we have found from experience that if the land is well prepared for a root or green crop, and has plenty of manure put into it, it is better under crop, even when the crop can be only in part fed on the land.

In the South of England, it is no uncommon thing to find six or eight ploughings, and as many harrowings, rollings, and couchings charged for a fallow, or for land that has been sown with a root or green crop. A full fallow never comprises less than five or six ploughings, &c., together with rent and rates on the land during the fallow year, and manure and seed, if any. Half-tillages are charged when the land has carried one grain crop after a fallow or green crop, and for this there is allowed one-half the expense incurred during the year of fallowing, unless the green crop has not been consumed on the land, when only one-fourth of the value of tillages and manures expended on the fallow is allowed, and nothing for rent and taxes. Many of the items it is impossible to test at the time they come up for valuation, yet for all these, and innumerable other small things, the incoming tenant is not only expected to pay, but to pay at extravagantly high rates, on the plea that the outgoing tenant was mulcted in like manner when he entered the farm.

This custom has done immense injury to the agriculture of those countries where it prevails, the cost of a fallow often amounting to 8*l.* or 10*l.* an acre, which is equivalent to locking up a capital of about 2*l.* an acre all round in the arable land, besides costing an additional 5 per cent. on this capital, and which 5 per cent. or 2*s.* an acre all round, can only come out of the landlord's pocket in the shape of diminished rent. It must be admitted, however, that the evil has been mitigated a little of late years by the more enlightened landowners redeeming such items of valuation as can be bought up in that way, in connection with crops and manures as well as tillages, but the effects of the system will not altogether disappear until valuers in these counties are empowered, not only to fix the prices of what is said to have been done, but to fix the *number* of tillages which they deem sufficient to have been performed, and to allow only for that number.

Many of the practices that obtain in respect to tillages seem to ignore the fact of there being an incoming tenant or of his interest altogether. But there can be no greater mistake than to suppose that it is the interest of the landlord to perpetuate these practices. It is, unquestionably, for the good of agriculture, and of every one connected with it, that ingoing farm valuations of every kind should be as small and light as possible, so that not more of the tenant's capital is locked up in fixed, and especially in non-productive, outlay, than is absolutely needful. If landowners and their agents on the one hand, and farmers on the other, were to keep this object before them, it would soon come to pass; and it would be the readiest means of bringing about another much-to-be-desired thing—that of having a general principle to go upon in these valuations which would apply to the whole country.

The cost of tillages depends primarily on the rate of wages, but on the worth of wages as well, and on the cost of horse labour and that of machinery. It is most important, therefore, in matters of such valuations, to have correct rules to go upon with respect to the cost and value of labour. As the rate of wages varies so much in different districts, it would be useless to lay down any fixed rule for that here; but the rate of wages in any district can always be ascertained, and calculations ought to be made on that basis. It is to be observed, however, that labour is often expended without any increase or profit. Further, the work of two men similarly employed is not always of equal value, and, consequently, it does not follow that where wages are lowest work is done cheapest.

The cost of horse labour is best calculated by taking the daily cost of a horse, and of the harness and implements required in its working. This includes horse keep, and shoeing, besides interest, risk, and depreciation on the prime cost of the animal, and interest, wear and tear, and depreciation on the cost of harness and implements. The price of an average farm horse is, let us say, *50l.* Five per cent. on that sum must be charged for interest, and 10 per cent. for risk and depreciation. Shoeing may be reckoned at 1*l.* The harness and implements employed in working vary from 30*l.* to 40*l.* for each horse, and 5 per cent. is chargeable on that amount for interest, and 10 per cent. for wear and tear and depreciation. Then there is the cost of feeding a farm horse. This varies a great deal, and will be most fairly given by adopting two scales. A pretty wide experience in the matter tells us that where it is the custom to work horses in single carts or two abreast in the plough they are not only worked at a higher pressure, but are fed harder, than where three or four horse teams and waggons are the rule. We merely state a fact in saying that in the former case the horses will generally be found consuming about one bushel of corn more a head per week. This of course is sufficient to account for a great difference in the cost of feeding a farm horse, and it also explains how two horses in a plough can sometimes do as much work as three or four similarly employed. If we have a three-horse engine, but only coal enough for a two-horse engine, we will only get the lesser amount of work done. It is the same with horses, substituting corn for coal. There must be fuel enough for the engine, whether it be a steam-engine or a horse-engine, if it is to do full work. To put the case as simply as possible, and without going into a mixture of foods, which would only make the calculation more complex to no purpose, we will assume that a full-fed horse receives three bushels of oats, or an equivalent, and an inferior-fed horse two bushels of oats, or an equivalent, a week, all the year round, allowing a little more when in full work, and a little less when not in full work; and that in each case the horse is allowed 2½ tons of straw for fodder and litter, and is twelve weeks on green food besides, during the year. Taking the straw at 42*s.* per ton, and the green food at 3*s.* 6*d.* per week for the twelve weeks, the straw and green food together would cost 7*l.* 7*s.*; but the stable manure ought to be worth at least two guineas per horse, and deducting that amount from the value of the straw and green food, it leaves 5*l.* 5*s.* chargeable against the horse for food, in addition to the price of the oats consumed. The annual cost in the one case would then be—

	£	*s.*	*d.*
156 bushels of oats at 3*s* 9*d.* . . .	29	5	0
Straw and green food	5	5	0
Interest, risk, and depreciation on 50*l.* at 15 per cent.	7	10	0
Shoeing	1	0	0
Harness and implements—wear and tear and depreciation on 40*l.* at 15 per cent.	6	0	0
	£49	0	0

and in the other—

	£	*s.*	*d.*
104 bushels of oats at 3*s.* 9*d.* . . .	19	10	0
Straw and green food	5	5	0
Interest, risk, and depreciation on 50*l.* at 15 per cent.	7	10	0
Shoeing	1	0	0
Harness and implements—wear and tear and depreciation on 30*l.* at 15 per cent.	4	10	0
	£37	15	0

Now reckoning that the horse does 290 days of actual work during the year, the day's work of a horse, including the ordinary implements, would cost, in round numbers, 3*s*. 4*d*. on the higher scale, and 2*s*. 7*d*. on the lower scale.

This basis gives a fixed rule for estimating whatever kind of horse work is done and by whatever number of horses. We have only to multiply by the 3*s*. 4*d*. rate when not more than two horses are used, and by the 2*s*. 7*d*. rate when more than two horses are used in ordinary tillages and farm work, and add the day's wages of the ploughman in each case, to arrive at the total cost of a day's work. If a ploughman's wages are 18*s*. a week, and a boy's wages 6*s*. a week, a man and two horses will cost 9*s*. 8*d*. a day, and a man and boy and three horses will cost 11*s*. 9*d*. a day. Again, if the day's work in each case was one acre of land ploughed, the cost of ploughing would be 9*s*. 8*d*. and 11*s*. 9*d*. an acre, respectively.

The standard day's work for a plough is one acre, but the work done in ploughing is a very variable quantity, as so much depends on the strength of the land and on the season of the year when the work is done. On heavy land the day's work is nearer three quarters of an acre than one acre. There is a deal of difference too between ploughing lea in August for wheat sowing and in January for oat sowing, when three quarters of an acre of the former will be as good a day's work as one acre of the latter. Then in breaking up early stubbles, when the land is dry and hard, one acre a day is generally stiff work, whereas later on, and in cross-stirring spring fallows, as also in ploughing light turnip land, one and a quarter acre can as easily be got over. These differences have all to be considered in forming an estimate of the quantity of land that should be ploughed in a day.

A pair of horses working a cultivator will get over five acres a day on light land, and four acres on heavy land: harrowing, once over, twelve acres on light land, and ten acres on heavy land; rolling, fallow land ten acres, corn or seed land twelve acres, and grass land fifteen acres a day.

In seeding corn land, a pair of horses with two men will drill twelve acres; a man will hand-sow ten acres. Thirteen men and five horses, with a reaping machine, will reap, cart, and stack six acres of corn in a day, which, with horses at 3*s.* 4*d.* and men at 5*s.* per day, amounts to 13*s.* 7*d.* per acre. It is in many cases actually done for 13*s.* per acre, both north and south, but it often costs more. Cutting corn by machine can be done at the rate of ten acres a day, cutting round the field; if cutting only one way, six acres. Cutting by hand with scythe or sickle, a man will cut, bind, and stook one third of an acre a day. Threshing and dressing corn by steam power, including coal and labour of every kind, costs for wheat 1*s.* 4*d.* per quarter; barley 1*s.* 2*d.* per quarter; and oats 1*s.* per quarter. By horse power it costs about one half more. Thatching ricks, a man will do 400 square feet of surface in a day, and it is usually paid for at the rate of 1*s.* per square of 100 feet.

Sowing grass or clover seeds broadcast a man can do eight acres a day; a man with a hand seed-barrow ten acres. Two horses working a broadcasting machine, with two men, will do twenty-five acres. Mowing grass by hand, one and a quarter acres each man; cutting by machine, ten acres.

Ridging turnip land, one plough, four acres a day. A man and a horse sowing turnips on the ridge, six acres a day. One man loading dung, thirty cart loads; spreading dung, one acre; sowing artificial manure broadcast, six acres; in the drill, four acres. Drilling turnip land on the flat with artificial manure at same time, two men and two horses, eight acres a day. The same for other root and green crops. A man hoeing and singling turnips, one third of an acre a day; planting potatoes in ridges, half an acre; planting cabbages, two and a half acres a day.

In making out his valuation of tillages, or of crops, manures, or improvements, &c., the valuer should show the particulars of each separate item comprised therein, and the amount at which he has valued each item, separately. It is an advantage for all parties concerned in a valuation to know how that valuation is made out, and it should therefore be an observed rule to give the details and prices, and not a bare enumeration of the articles and the values lumped in the sum total, as is too frequently the case.

CHAPTER V.

VALUATION OF CROPS.

An outgoing tenant claims for tillages under the custom of the country, or by virtue of his agreement, but the common law gives him a right to emblements, or an away-going crop: 'lest the ground should be unmanured, which would be hurtful to the commonwealth, he shall reap the crop which he sowed, in peace.'

The law of emblements applies to all crops that require to be annually renewed, such as corn crops, root crops, and green crops. But those crops which do not require an annual renewal, though they are crops that may be rendered more abundant by the labour and manurance of the tenant, such as grass, and the fruit of trees, are not claimable as emblements. To this, however, there are two exceptions; for, although the roots of clover bear several crops, the tenant can take the clover crop immediately succeeding his outgoing; and the same is allowed with the hop crop, which grows from ancient roots, because of the greatness of the labour and manure which has to be annually bestowed on that crop to bring it to perfection.

The tenant's right of way-going in certain crops depends, of course, on the time of his outgoing, and on the conditions under which he held his farm. Thus, at the spring terms of Ladyday or Whitsunday he can generally claim: (1), the corn crops, and (2) the young seeds and clover crops of that year, or payment in lieu thereof; and, at the autumn terms of Michaelmas or Martinmas: (1) the unconsumed root crops, (2) the unconsumed green crops, and (3), the seeds sown with the corn crop the preceding spring—sometimes, also, as in Surrey, he can claim payment for the clover Ley. Custom, as well as agreement, now and then modifies the case a little, but these are the chief crops in a farm valuation, and such is the time and the way they ordinarily arise to be valued. Hay and straw, likewise, not improperly fall in here, being crop produce, and, as such, their valuation will be considered under the head of crops.

As in all other kinds of farm valuations, the method of estimating growing crops and bulky field produce unhappily varies in different districts, and the adopted standards of worth are very conflicting. The subject may, however, be simply considered in two aspects. The first, that of young crops, which are either valued prospectively, or else charged at cost price; the second, that of ripened or matured crops, which are valued at market price, or at fodder or consuming price, but sometimes also, as in the case of root crops, at cost price.

A great deal of the misunderstanding that arises on crop valuations is no doubt due to the want of a clear definition of the terms *cost* price, *fodder* or *consuming* price, and *market* price, and the relations they bear one to another. Cost price is just what the crop has cost in tillages, seed, manure, rent, rates, and interest on outlay of capital. Fodder and consuming price are in some parts of the country held to be different, fodder price being reckoned at one-half, and consuming price at two-thirds that of market price, although, in reality, they may not bear that relation to market price at all. The two terms, fodder price and consuming price, are, to all intents and purposes, identical, and signify what the crop is worth to feed on the farm, without including the value of the manure that is so left to the land. Market value is the entire value of the crop—i.e., the fodder or consuming value *plus* the manure value. The fodder or consuming value of a crop is best calculated by taking the quantity of it that is equal to the production of one pound of beef or mutton, and fixing the price of that quantity at the price of one pound of meat. When the meat-producing power of any crop or article of field produce is known, the rule is very easy to apply, and it is on the whole a safe one.

Corn Crops.

When wheat, barley, oats, peas, beans, and other corn crops are valued, it is always in the ripened state, and they are estimated according to the quantity and quality of grain they promise to yield; deducting the expenses of reaping, threshing, ingathering, and marketing the produce, together with the rent of the corn land for that year; and leaving the straw to the incoming tenant, at a separate valuation, or free (steelbow), as the lease may require.

In England, the outgoing tenant usually reaps the corn crop which he sowed, and threshes it out at his own cost, leaving the straw as aforesaid, or, the incoming tenant is bound to thresh, clean, and carry out the corn crop for his predecessor, in return for the fodder of the straw.

In Scotland, where the entry to farms is chiefly at Whitsunday, the corn crop is invariably taken by the incoming tenant at valuation. The price is usually based on the *fiars* prices for the county, which are struck in March. The valuers meet to examine the crop shortly before harvest, and make a memorandum of the quantity and quality of grain which they estimate to each field: then, after the *fiars* prices are struck they meet again, and fix the price at which the crop is to be calculated—at, above, or below the *fiars* prices—and the allowance that is to be made to the new tenant for the expenses of harvesting and marketing the crop.

The *fiars* standard is a good one in its way, but in the Scotch system of valuing corn crops, the time at which the risk passes, and also the terms of payment, often give rise to complaints. The risk is usually held to remain with the old tenant until the crop has been ingathered. This proves very vexatious if any question of loss or damage crops up, for which, indeed, the way seems purposely left open. The risk in a corn crop, as in other subjects of valuation, should be made to pass at the time the crop is valued.[1] The terms of payment are equally bad for the outgoing tenant. He gets the first instalment of one-half when the price is fixed in March, and the second and final instalment is deferred until August following. It is thus fifteen months after leaving his farm before he gets a settlement for the crop which was reaped twelve months before.

A second method of valuing corn crops, besides that of taking the *fiars* prices as the standard, is to value in the usual way, and to take past or present averages of corn prices as the basis, and fix the price of the crop there and then. This method is in some respects to be preferred, for it enables the matter to be settled off at once, without the delay that attends the other.

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[1] That this is the view at law, appears from a case in point, *Mackenzie* v. *Mackenzie*, recently decided in the Sheriffs' Court of Ross-shire. The defender was incoming tenant to a farm at Whitsunday 1877, and agreed to take the grain crop at a valuation. The crop was accordingly inspected by the appointed valuators, who ultimately agreed as to its value, and signed their award on October 10. Subsequently a storm came and partially destroyed the crop before it was all cut, and the defender refused to pay for it. The sheriff-substitute, however, found for the pursuers, the outgoing tenants, holding that the risk was at once transferred to the defender when the crop was valued. An appeal having been taken to the sheriff-principal, the above decision has been confirmed with additional expenses.

A third method is, instead of estimating the weight of the crop as in the other cases, at harvest time to rick each field separately, and then select an average sized rick from each, and thresh it out as a guide to the yield.

Straw.

When this produce has to be valued at *fodder* or *consuming* price, it may be found by the rule already given. It is more accurate to value straw even on this principle than on any other. The following are the weights of the different kinds of straw that may be considered equal to the production of one pound of beef or mutton:—

	lbs.
Pea straw	30
Oat straw	40
Barley straw	54
Wheat straw	54
Bean straw	65

Then, if the market price of one pound of meat is 9*d.*, the fodder or consuming value, according to this rule, of pea straw would be 2*l.* 16*s.*, of oat straw 2*l.* 2*s.*, of barley straw 1*l.* 11*s.*, of wheat straw 1*l.* 11*s.*, and of bean straw 1*l.* 5*s.* 10*d.*, per ton. That is without reckoning the manure value of the straw, which, in the case of wheat, Mr. Lawes estimates at 12*s.* 6*d.*, and that would make the market value of a ton of wheat straw 2*l.* 3*s.* 6*d.* The present quotations of the straw market are from 43*s.* to 53*s.* per ton, which proves the rule given above to be pretty correct.

The weight of straw ricks may be found by measurement in the same way as hay ricks (*see* rule, p. 54,) only, in the case of straw, the number of cubic feet in the rick must be divided by 600 to get the weight in tons. When the corn is unthreshed the weight of straw may be found in the same way as the quantity of grain, by threshing out part of a rick, and then weighing the straw from a quarter of grain, and calculating the amount of the straw from the entire field on that proportion. If neither of these two methods are available, the weight of straw can be approximately arrived at by taking the relative weights of straw and grain as generally adopted. It has been found, by various experiments, that for every *cwt.* of threshed grain, the ratio in weight of clean dry straw runs nearly as follows:—

	Cwt.
Pea straw	1½
Oat straw	1⅔
Barley straw	1
Wheat straw	1¾
Bean straw	1⅔

By bearing these proportions in mind they will often be found to come in useful. For example: If 120 qrs. of oats, weighing 42 lbs. per bushel, were threshed from one field, that is equivalent to 18 tons of grain; and, on the above ratio, the weight of straw from the same field would be 30 tons.

Root and Green Crops.

These crops are valued to the incoming tenant either (1) at a *consuming* price, or (2) at the *cost* of producing them.

The consuming price is found according to the previous rule. Thus, if 160 lbs. weight of turnips is equal to the production of one pound of meat, when the latter is selling at 9*d.* per pound, the consuming value of a ton of turnips will be 10*s.* 6*d.* And, next, supposing that the estimated weight per acre is 20 tons, the consuming value of the crop will be 10*l.* 10*s.* per acre.

If the calculations are based on the nutritive matter contained in them, many of the crops will give a different and a higher value. But, in ordinary cases, we have no right to assume that these raw crops are dry concentrated food. The other rule is, therefore, the safest one. The weight of each of the principal root and green crops, required to produce one pound of meat, is here given:—

	lbs.
Turnips	160
Swedes	120
Cabbage	110
Carrots	100
Parsnips	100
Mangold wurtzel	90
Kohl rabi	90
Green vetches	90
Green clover	90
Green rape	60
Potatoes	50

The practice of sometimes paying for a root or green crop at what it has cost the outgoing tenant is, in these valuations, a most objectionable one. There is an incoming tenant as well as an outgoing tenant, and why should that be unfair to the outgoer which is no more than justice to the incomer? In many districts it is the rule to pay for a crop of this kind at what it has cost to produce it, no matter whether there is a crop to show for the money or not. But the outgoing tenant would be more careful to leave a good crop if he knew he would only be paid for it according to results, and the incoming tenant would then receive value for his money, which it cannot be said he does in every case where the crop is paid for at what it is said to have cost.

The weight of the turnip crop is more variable than any of the others, partly, perhaps, because it is more widely grown. In the south of England fifteen tons per acre is a full crop, but in Wales, the north of England, and Scotland, less than twenty to thirty tons is not considered a full crop. A good crop in the north will keep 200 half-bred ewes one week, and eat to 10*l.* an acre. That is the usual calculation in Selkirkshire for sheep on full allowance of turnips, and we have many times seen it done; but probably more eat below 10*l.* an acre than above it, although there are plenty of instances of a crop doing more. In 1866, a turnip crop in Perthshire, which was fed by Cheviot wethers at 9*d.* a head per week, gave the extraordinarily high figure of 16*l.* per acre for consuming value, over and above the manure left on the land, which is reckoned worth half the feeding value of a turnip crop. The Norfolk rule is very much less than the above, as it assumes that 100 sheep will eat an acre of turnips in a week. The Norfolk rule will also apply to the south of England.

Young Grasses and Clovers.

Under this head may be classed clover, ryegrass, and mixed grass and clover seeds. The cost of seed and labour incurred in laying down a crop of this kind is either charged to the incoming tenant, or the crop is valued at its prospective worth. In the first case, the appearance of the crop will show whether the right sorts and quantities of seeds have been sown, and if they have been properly sown. Sixteen pounds of clover seed should be sown per acre, and plantain or ribgrass may be mixed with it, as it helps to give the clover a good bottom. A mixture of clover and ribgrass, say—

8	lbs.	common red clover,
3	,,	white clover,
3	,,	common perennial or cowgrass,
2	,,	plantain or ribgrass,

is better than any one kind of clover sown alone. If grass-seeds are added—

1½ bush. ryegrass—Italian for one year,
perennial if for more.

5	lbs.	cocksfoot,
3	,,	timothy,
2	,,	fescue.

The following table gives the principal cultivated grasses, their present price per pound, and the quantities in pounds weight to sow of each on different soils, and with different husbandry:—

English names of grasses	Price per lb.	ALTERNATE HUSBANDRY						PERMANENT PASTURE					
		Light and medium soils			Heavy soils			Light soils		Medium soils		Heavy soils	
		1 Year's lay	2 Years' lay	3 Years' lay	1 Year's lay	2 Years' lay	3 Years' lay	With a crop	Without a crop	With a crop	Without a crop	With a crop	Without a crop
Cocksfoot	1*s.*	—	2	2	—	2	2	3½	4	4	5	4	5
Italian ryegrass	—	9	9	9	9	9	9	6	7	7	8	8	9
Perennial ryegrass	—	15	15	15	15	15	15	8	9	9	10	9	10
Yellow clover	—	—	1	1	1	2	2	1	1	1	1	1¼	1¼
Timothy grass	9*d.*	1	2	2	1	2	2	1½	2	2	2½	2½	3
Clover hybrid	—	1	2	2	1	2	2	1½	2	1½	2	2½	2½
Red clover	—	8	4	4	8	4	4	1	1	1	1¼	1½	1½
Clover perennial	—	—	2	4	—	2	4	2	2½	3	3½	3½	3½
White clover	—	2	4	4	2	4	4	4	4	4	5	5	6
Foxtail grass	2*s.*	—	—	—	—	—	—	1¼	1½	1½	2	2	2½
Sweet-scented vernal grass	1*s.* 3*d*	—	—	—	—	—	—	½	½	½	½	½	½
Yellow oat-like grass	9*d.*	—	—	—	—	—	—	1	1	1	1	—	—
Fescue grass, hard	10*d.*	—	—	—	—	—	—	2	2	2	2½	2	2½
Tall meadow fescue	1*s.*	—	—	—	—	—	—	—	—	2	2	2½	2½
Redfescue grass	10*d.*	—	—	—	—	—	—	2	2	—	—	—	—
Meadow fescue	1*s.*	—	—	—	—	—	—	2	2	3	3½	3½	4
Various-leaved fescue	1*s.*	—	—	—	—	—	—	—	—	2	2	2	2
Pounds	—	36	41	43	37	42	44	37¼	41½	44½	51¾	49¾	55¼

In valuing a crop of young grass or seeds prospectively, the possible yield of dry grass must be estimated from the appearance of the young crop, the condition of the soil, and other circumstances, and the price fixed on that of hay of a similar kind.

Hay.

This produce has sometimes to be valued at market price, and sometimes at fodder or consuming price. The price in both cases is based on the age and the kind as well as the quality of the hay. Old hay, also, is worth about 15*s.* or 20*s.* a ton more than new hay of its kind. The quality varies with the land the hay was grown upon, the time of cutting, the mode of making, and the condition in which it was stacked and thatched. The following are the chief varieties of hay, and the weight of each required to make one pound of meat:—

Clover hay	16 lbs.
Ryegrass hay	18 ,,
Common meadow hay	20 lbs.

Then, by our former rule, if meat is selling at 9*d.* per lb., and 16 lbs. of clover hay will produce 1 lb. of meat, the consuming value of one ton of clover hay will be 5*l.* 5*s.*

The weight of hay ricks is easily ascertained by measurement. This may be taken by the following rules:—

1. *Square Ricks.*—Take the height from the

ground to the eaves, and add one-third of the height from the eaves to the top, for the mean height; then multiply the mean height by the breadth, and the product by the length.

2. *Oblong Ricks.*—To the height from the ground to the eaves, add half the perpendicular height of the top for the mean height; then multiply the mean height by the breadth, and the product by the length.
3. *Circular Ricks.*—Multiply the square of one-fifth the mean girth by twice the mean height.

Let the solid contents in each case be worked out in feet. Then, to find the tons weight of hay in the rick, divide the number of cubic feet by 375 in the case of old hay, and by 400 in the case of new hay.

The rules for measuring thatching work on ricks may also be given here.

1. To find the quantity of thatching on square or oblong ricks:—

Rule.—Multiply the girth across the top from eave to eave by the length at the eave, both in feet, and divide the product by 100 for the quantity in squares of 100 square feet. If the ends of the rick are thatched, add the breadth of the rick to the length for the multiplier.

2. To find the quantity of thatching when the roof of the rick or stack is conical:—

Rule.— Multiply the circumference at the eaves by half the slant height, both in feet, and divide the product by 100 for the quantity in squares of 100 square feet.

Damage and loss to crops, arising from hailstorms, wind, rain, and other causes, are often the subject of valuation, both on behalf of insurance offices and between outgoing and incoming tenants. A corn crop may lose half its value by a simple storm of wind or hail, or by an unpropitious harvest. The loss from these causes is not always easy to estimate. The damage done to a crop by shaking can only be judged of. In the case of spoiled grain and straw from a wet harvest, the question is even less simple, for both loss and depreciation have then to be considered, and also how far the tenant may be liable for neglect.

CHAPTER VI.

VALUATION OF MANURES.

1. *Artificial Manures.*

Manures of this class, including guano, are valued according to their analysis and the current market price at which the different fertilising ingredients shown in the analysis can be bought in the pure state. There is no truer guide than the commercial one. If we take the effectiveness of any one manure on different soils, or with different crops, or in different climates, no two of the experiments will be found to agree in the results. But composition and market value give a fixed and definite basis to go upon in any estimates of the kind.

Nitrogen, phosphoric acid, and potash, are the three chief ingredients in all manures. The other component parts in the analysis of a manure are comparatively of little importance, and in many cases their value has not practically to be considered.

Nitrogen is the standard value of all our foods, and, consequently, of all our manures. It is the nitrogen that imparts to manure its forcing properties. The stimulating character of nitrogenous manures makes them best suited to apply to plants in the young state, and they appear to influence the growth of wheat, barley, and the cereals generally, more than the application of phosphatic or alkaline compounds. It is also worthy of note that larger proportions of nitrogen are found in the straw than in the grain, and in the green than in the white straw, the upper part of the straw at harvest-time containing more nitrogen than the lower part, so that the upper part is best suited for fodder, and the other part for litter. Nitrogen is not only one of the most important, but it is also the most expensive article we have to buy in a manure. It is applied to plants in the form of ammonia, the chief sources of which are:—

1. Sal ammoniac	containing	30	per cent. of ammonia
2. Sulphate of ammonia	,,	24	,,
3. Nitrate of soda	,,	19	,,
4. Peruvian guano	,,	14	,,
5. Rape cake	,,	6	,,
6. Soot	,,	5	,,

It is not admitted that any plant can obtain its necessary quantity of nitrogen from the atmosphere, but that it must receive it from nitrogenous compounds. Mr. Sibson has lately pointed out that in the majority of cases, 8 to 10 per cent. of ammonia is quite sufficient to apply in any manure at the ordinary rate. The cheapest source of nitrogen depends on the markets for the time being. With sulphate of ammonia (containing 24 per cent. of ammonia, equal to 19·76 per cent. of nitrogen) selling at 20*l*. per ton, and nitrate of soda (containing 19 per cent. of ammonia, equal to 15·64 per cent. of nitrogen) selling at 15*l.* per ton, the nitrate is slightly the cheapest source of nitrogen. A good sample of nitrate of soda contains as much as 95 per cent. of the nitrate, but its crystals are very similar to those of common salt (chloride of sodium), and the latter, worth 20*s.* a ton, is often used to adulterate the nitrate which is worth 15*l.* a ton.

Phosphorus is always found in the choicer parts of plants, as in the grain of wheat, barley, &c., and in the bulbs of turnips and mangolds, &c.; in fact, phosphorus, like nitrogen, is intimately connected with the nutritive value of feeding materials. The amount of phosphorus in whole plants probably varies from one-fourth to less than one-tenth per cent., and the proportion of phosphoric acid compounds in vegetable ashes from 20 to 40 per cent. The fact that a large amount of phosphorus is required by all crops, and that it is naturally present in the soil in small quantities, readily explains the reason why the addition of this substance is generally followed by an increase of produce. The chief sources of this substance, for manure purposes, are coprolite deposits, bones, superphosphate, and the phosphatic guanos. The value of these manures mostly depends on the large amount of phosphoric acid they contain in the shape of phosphate of lime. The material difference between bones and superphosphate is, that the latter is for the most part soluble in water. Bone superphosphate is more soluble than coprolite or mineral, because the former contains gelatine, &c., which, in its decomposition, generates ammonia. Soluble phosphate in coprolite costs only 7*l.* per ton, whereas in bones and guano it costs 9*l.* per ton. As there is no difference whatever between them, the mineral phosphate is much the cheapest. The mode of preparing bones is to dissolve one ton of inch bones in a quarter of a ton of sulphuric acid and sixty gallons of boiling water. Dr. Stevenson Macadam has found that where the sulphuric acid is added in minimum quantity, so that the greater part of the phosphates is merely touched with the acid, the dissolved bones, as a rule, contain a greater total amount of phosphates, and a higher percentage of ammonia, than where more acid has been added and the phosphates have been made more soluble.

Potash exists in all vegetable substances. The ash of turnips, potatoes, and beetroot contains as much as 80 to 90 per cent. of potash. It produces a marked effect on all the root crops, and is also certain to stimulate the growth of the leguminous crops—beans, pease, clover, vetches, &c. One of the cheapest sources of potash now exists in kainit, or crude German potash salts, which contains 25 per cent. sulphate of potash, and sells for 2*l.* 10*s.* or 3*l.* per ton.

The value per ton of the different ingredients of manures has been estimated in a general way by our best agricultural chemists as follows :—

	£	*s.*	*d.*	
Ammonia	56	0	0	per ton
Nitrate of soda . . .	16	0	0	,,
Potash	20	0	0	,,

	£	s.	d.	
Phosphate of lime (bone earth)	9	6	8	per ton
Insoluble phosphate . . .	7	0	0	,,
Soluble phosphate . . .	30	0	0	,,
Phosphoric acid (alone) . .	18	0	0	,,
Alkaline salts	1	0	0	,,
Sulphate of lime . . .	1	0	0	,,
Organic matter . . .	0	10	0	,,

The prices at which these substances can be obtained vary, of course, with the markets, and with the various sources from which some of them are derived. But given the prices as above, and the analysis of any manure, its value can be determined by multiplying each of the constituents by its market value per ton, which will give the value of 100 tons, and then dividing by 100 to get the value per ton. For example: The value of a sample of Peruvian guano, showing the following analysis, at the above prices, would be 12*l.* 7*s.* 8*d.* per ton.

Constituent	Analysis	Market price of pure substance per ton			Value of manure		
		£	s.	d.	£	s.	d.
Moisture	17·12		—			—	
Organic matter, containing nitrogen 14·64 = to ammonia 17·77	51·31	0	10	0	25	13	0
Phosphate of lime . . .	22·55	9	6	8	209	14	3
Alkaline salts	7·94	1	0	0	7	18	9
Earthy matter	1·08		—			—	
	100·00						
Ammonia	17·77	56	0	0	995	2	4
				100)	1238	8	4
Value per ton . . .					12	7	8

In buying a manure it is very important to get just all the ingredients we require, without having to pay for those we do not require. Peruvian guano, for example, is one of the highest sources of ammonia, but it may contain a greater proportion of it than we want, and if we have to pay for the other substances in the guano at the same time, but do not require them, it would be an expensive way of getting ammonia. Peruvian guano is of most effect on heavy clays containing but little organic matter, and for cereals, or else mixed with other manures for the root crop. It is often adulterated with clay and inferior phosphatic guanos. A bushel of good Peruvian guano should weigh about 72 lbs. per bushel, while adulterated kinds will weigh more. The lighter its weight per bushel the better, provided that when mixed with water none of the particles float on the surface. When genuine, it has a light brown or greyish colour, and if three-quarters of an ounce of it be burned on a piece of tin or iron placed on a clear fire, the residue will not be more than a quarter of an ounce. If it amounts to half an ounce, the sample is either extremely inferior, or else grossly adulterated.

2. *Farmyard Manure.*

As there is seldom an analysis made of any given sample of farmyard manure, and it cannot be so readily ascertained as in the case of artificial manures, the above method of valuation can scarcely ever be applied to manure of this class. Otherwise, however, the same principle applies equally here. It is calculated that on an average 10 tons of good farmyard dung convey to the soil 1 cwt. of ammonia, 78 lbs. of phosphoric acid, and 78 lbs. of potash. Now, according to the present selling prices of these substances, the value of the dung would be:—

	£	*s.*	*d.*
1 cwt. ammonia at 56*l.* per ton . . .	2	16	0
78 lbs. phosphoric acid at 18*l.* per ton .	0	12	6
78 lbs potash at 20*l.* per ton . . .	0	13	11
Value of 10 tons . . .	4	2	5

or 8*s.* 3*d.* per ton.

But the composition of farmyard manure is very variable, and is found to differ with :

1. The quantity, quality, and kind of food supplied to the animals that produce it.
2. The relative number of animals of one species that produced it, the age of the animals, and their breed and constitution.
3. The quantity, quality, and kind of straw used for litter.
4. The mode of making and preserving the manure, and whether under cover or not.

'The value of manure from the consumption of food,' Dr. Voelcker remarks, 'may be said to depend almost exclusively on the amount of nitrogen, phosphoric acid, and potash, which they contain. The superior fertilising properties of the manure of fattening stock fed upon cake, is mainly due to the higher percentage of nitrogenous constituents, and it should be known that by far the greater portion of the nitrogen of the food is recovered in the manure. Associated with nitrogenous substances we always find phosphates and potash; and food rich in nitrogenous substances will generally also produce manure richer in phosphates and potash than food which is comparatively poor in nitrogenous constituents.

'A portion of the nitrogen of the food is, of course, retained in the increase of the animal. Now, 14 parts of nitrogen yield 17 parts of ammonia, and if we assume that for every pound of nitrogen in the mixed foods (and litter, if any) we obtain one pound of ammonia in the manure, this will be equivalent to supposing that for every 100 parts of nitrogen in the food, 82½ parts are recovered in the manure, leaving about 17½ per cent. for the increase, and some for loss, which is perhaps a sufficiently approximate average estimate.'

The following are the estimated money values of the manure from each ton of food consumed, as given by Mr. Lawes and Dr. Voelcker:—

Description of Food	Mr. Lawes			Dr. Voelcker		
	£	s.	d.	£	s.	d.
Decorticated cotton cake . . .	6	10	0	5	6	6
„ earth nut cake . .	—			4	18	0
Rape cake	4	18	6	4	8	9
Linseed cake	4	12	6	3	15	8
Undecorticated cotton cake . .	3	18	6	2	18	0
„ earth nut cake .	—			2	10	0

Description of Food	Mr. Lawes			Dr. Voelcker		
	£	s.	d.	£	s.	d,
Linseed	3	13	0	2	17	9
Lentils	3	17	0	3	2	0
Peas	3	2	6	3	2	0
Beans	3	14	0	3	2	0
Tares	3	13	0		—	
Malt dust	4	5	6	3	11	0
Bran	2	17	0	2	15	0
Pollard	2	17	0	2	15	0
Malt	1	11	6	1	6	0
Indian corn	1	11	0	1	5	0
Locust beans	1	2	6	0	18	3
Rice meal		—		1	0	0
Brewers' grains		—		0	12	0
Oats	1	15	0		—	
Wheat	1	13	0	1	7	0
Barley	1	10	0	1	5	0
Clover hay	2	5	6		—	
Meadow hay	1	10	0		—	
Bean straw	1	0	6		—	
Pea ,,	0	18	9		—	
Oat ,,	0	13	6		—	
Wheat ,,	0	12	6		—	
Barley ,,	0	10	9		—	
Potatoes	0	7	0	0	7	0
Parsnips	0	5	6	0	5	6
Mangolds	0	5	3	0	5	3
Swedes	0	4	3	0	4	3
Common turnips	0	4	0	0	4	0
Carrots	0	4	0	0	4	0

It must be said that practical experience does not yet bear out either of the estimates of the manurial values which are thus put upon the different feeding stuffs—certainly not in some of the higher of them; but it is not unlikely that practice is the one at fault. The greatest difference will be found in the estimates of cake, and of hay and straw. Practical men have been in the habit of estimating the manurial value of hay at 15*s.* per ton, and of straw at 8*s.* per ton. But

Mr. Lawes is no doubt right in taking the value at the full quantity of fertilising matter contained in the residue of the food; and, that being so, it appears to point to great imperfection in the present common manner of making, storing, and conserving farmyard manure. The loss, in fact, is represented by the difference. Probably, the time will come when Mr. Lawes' figures will agree with the practical value put upon the manures from different foods. At present, however, this is not so; nor can it be otherwise until there is better economy in the management of the manure heap. Mr. Lawes estimates the value of the manure at what it should be and may be; but, practically, we have to value it at what it is worth, and if half the valuable constituents are lost the value will be just half what it once was and what it might have been still.

A great deal also depends on what animals produce the manure. The solid manure of the horse is very valuable, and so is that of the sheep. Cow and pig manure are colder, and pasty, and tenacious, but capable of greatly enriching the soil. No phosphates pass away in the urine of the horse, but from the other animals large quantities pass away in this form. The proportion of liquid and solid parts, and the proportion of nitrogen, phosphoric acid, and alkaline salts in each of them is here given:—

In 1000 parts		Horse	Sheep	Pig	Cow
Water		750	640	700	850
Solid parts		250	360	300	150
Liquid excreta	Nitrogen = ammonia	14	14	3	9
	Alkaline salt	14	10	2	16
Solid excreta	Phosphoric acid = phosphate of lime	8	5	5	6
	Alkaline salt	3½	3	5½	2⅓

The use of straw in making manure is to absorb the excess of liquid in the manure. Too little straw in manure-making is, therefore, as bad as too much, as the liquid escapes if not taken up by the straw; and, on the other hand, if more straw is used than is required for this purpose the manure is worth less. The use of long straw for the purpose is always a very expensive and imperfect way of making manure. One-third of the straw cut into short lengths—say at every node—will take up more liquid than three times the quantity of long straw, and make better manure and keep the cattle drier at the same time.

Manure made and kept under cover gives better results than manure from uncovered yards. ‘Generally speaking,’ says Dr. Voelcker, ‘with equal weights of the two descriptions of manure, the manure from the covered yard is worth fully half more than the manure made in open yards.’ By rotting and decomposing it in the air, and letting it be washed by the rain, farmyard manure loses 25 per cent., not only in bulk, but in its valuable constituents. Fresh-made dung contains a very small quantity of ammonia in the free state. The ammonia is generated by decomposition, and, therefore, if not fixed, as it may be, by diluting the heap with sulphuric acid, it will volatilise and pass away. But the greatest loss of ammonia is often by drainage from the manure heap, which should be carefully guarded against. The best position for a manure heap is on level ground, and the larger the heap is, the less it will lose by the influence of sun, air, and rain. Dung should rarely be turned, even for rotting, and never at all without taking precautionary measures to fix the ammonia, which will otherwise be lost. Dung may, however, be spread on the land a long time before it is actually required, and it will thus lose little, if any, of its fertilising ingredients, as the soil absorbs and retains them: clay soils, in particular, having the power of fixing the ammonia, &c., of the manure.

When a dung-heap is measured, it should be of the natural firmness, and neither trodden nor loose. If it has been moved or turned within a fortnight of the time of measuring, one-third of the measured quantity should be disallowed, as one yard of sodden dung makes one and a half yard when newly moved; and, in like manner, if the dung has been trampled by cattle in sheds or boxes, and has not been moved, one-third should be added, as one yard of trampled dung makes one and a half yard when thrown into heap and allowed to settle with its own weight. The depth of the heap should be taken at several parts, and the price fixed at so much per cubic yard, according to the quality. To find the cubic contents of a dung-heap,—multiply the mean length, breadth, and depth together, and divide the product by 27, to get the number of cubic yards. When the dung is of settled firmness, and good, one and a half cubic yard will about equal one ton in weight; if it is very strawy it will take considerably more to make a ton. The price paid for dung at valuation varies from 3*s.* 6*d.* per cubic yard for ordinary open farmyard dung to 5*s.* per cubic yard for cake-fed dung, and upwards. It should be rotten enough to cut with a spade. At these prices it is as good value as any other manure, allowing twenty cubic yards of ordinary dung, and fourteen cubic yards of cake-fed dung, per acre.

CHAPTER VII.

VALUATION OF IMPROVEMENTS.

In the present phase of the question of compensation for improvements, we cannot, perhaps, do better than take the 'Agricultural Holdings Act (England) 1875' for the groundwork of our present chapter. The Act divides improvements into three classes, as follows :—

First Class.

1. Drainage of land.
2. Erection or enlargement of buildings.
3. Laying down of permanent pasture.
4. Making and planting of osier beds.
5. Making of water-meadows or works of irrigation.
6. Making of gardens.
7. Making or improving roads or bridges.
8. Making or improving of water-courses, ponds, wells, or reservoirs, or of works for supply of water for agricultural or domestic purposes
9. Making of fences.
10. Planting of hops.

11. Planting of orchards.
12. Reclaiming of waste land.
13. Warping of land.

Second Class.

1. Boning of land with undissolved bones.
2. Chalking of land.
3. Clay burning.
4. Claying of land.
5. Liming of land.
6. Marling of land.

Third Class.

1. Application to land of purchased artificial, or other purchased manure.
2. Consumption on the holding, by cattle, sheep, or pigs, of cake or other feeding stuff not produced on the holding.

The Act does not apply to any improvement of the first class made more than twenty years; nor to any improvement of the second class made more than seven years; nor to any improvement of the third class made more than two years before the tenant quits the holding.

Improvements of the First Class.

In order to obtain compensation in this class, the improvement must not only have been effected within twenty years, but the tenant must have had the previous written consent of the landlord or his agent before he began the improvement; and not only that, but, at the time the claim for compensation is made, the improvement must be in good tenantable repair or condition. 'If it is not in good tenantable repair or condition, then the amount payable to the tenant for compensation will be reduced by such sum as may be necessary to put such improvement into tenantable repair or good condition.'

'The amount of the tenant's compensation in respect of an improvement of the first class shall, subject to the provisions of this Act, be the sum laid out by the tenant on the improvement, with a deduction of a proportionate part thereof for each year, while the tenancy endures after the year of tenancy in which the outlay is made, and while the improvement continues unexhausted; but so that where the landlord was not, at the time of the consent given to the execution of the improvement, absolute owner of the holding for his own benefit, the amount of the compensation shall not exceed a capital sum fairly representing the addition which the improvement, as far as it continues unexhausted at the determination of the tenancy, then makes to the letting value of the holding.'

The meaning of the Act on this point is perfectly clear. If the improvement comes under the Reservation clause, and the landlord was not absolute owner at the time the improvement was made, the tenant will only be entitled to be paid for the increase to the letting value of the holding which is due to such improvement. Otherwise, however, the amount of compensation is to be the sum laid out on the improvement, with a deduction of a proportionate part thereof for every year it has been made. Thus, if 500*l*. was expended on an improvement of the first class five years before the tenant left the holding, the amount of compensation would, subject to the provisions of the Act already noticed, be for fifteen-twentieths of the original outlay, or 375*l*. The rule to find the unexhausted value of the improvement is—multiply the outlay by the number of years unexpired and divide by 20. Or, it may be found by simply multiplying the outlay by the decimal in the following table which stands opposite the number of years that have elapsed since the improvement was made. For example, if, as in the above case, 500*l*. was expended on an improvement, and compensation had to be made in the sixth year, the amount payable would be 500 × ·75 = 375*l*.

For an improvement in the	To find the unexhausted value, multiply the original outlay by	For an improvement in the	To find the unexhausted value, multiply the original outlay by
1st year	1·	11th year	·50
2nd „	·95	12th „	·45
3rd „	·90	13th „	·40
4th „	·85	14th „	·35
5th „	·80	15th „	·30
6th „	·75	16th „	·25
7th „	·70	17th „	·20
8th „	·65	18th „	·15
9th „	·60	19th „	·10
10th „	·55	20th „	·05

Any objections to awarding compensation for an improvement of the first class on a rule of this kind are in a great measure anticipated by the provisions of the Act itself. The previous consent of the landlord has to be obtained before the tenant undertakes the improvement, and this alone ought to be a sufficient guarantee that the improvement is one suitable to the holding, and likely to increase its letting value. Then the improvement has to be left in good condition or repair, or be put into that condition by the tenant before he is awarded any compensation, which doubly insures the landlord against having to pay on improvements which are otherwise than real, or which are not calculated to increase the letting value of the holding. Subject to such conditions, it is not unreasonable to make the compensation proportionate to the outlay and the number of years that have elapsed since the improvement was made.

Improvements of the Second Class.

In order to obtain compensation in this class the improvement must not only have been made within seven years, but the tenant must either produce the written authority of the landlord or his agent, or prove that he gave the landlord or his agent, not more than forty-two nor less than seven days before he began it, a written notice of his intention to make the improvement, and that at the time he gave such notice he had not given or received notice to quit his holding.

'The amount of the tenant's compensation in respect of an improvement of the second class shall, subject to the provisions of this Act, be the sum properly laid out by the tenant on the improvement, with a deduction of a proportionate part for each year, while the tenancy endures after the year of the tenancy in which the outlay is made, and while the improvement continues unexhausted.'

The principle on which the compensation is to be made in this class is the same as in the first class. But here the valuer has to decide on the sum which he thinks has been 'properly laid out.' If he is of opinion that the improvement was not a suitable one to the holding, or that the outlay was injudiciously made, he may award on only part of the outlay, or, in extreme cases, he may award nothing at all.

There can be no doubt that all of the six improvements enumerated in this class will, if at all suitable to the holding, be durable for seven years, and some of them often for a great deal more. But great as is the improvement which results from each of them, when it is rightly made and made in the right place, there are, at the same time, lands where one and all of them may, under certain conditions, be applied without any beneficial effect whatever.

Assuming the outlay to have been properly made, the following is the rule to find the unexhausted value of the improvement:—Multiply the outlay by the number of years unexpired, and divide by seven. Or, it may be found by simply multiplying the outlay by the decimal in the following table which stands opposite to the number of years that have elapsed since the improvement was made. For example, if 100*l.* was expended on an improvement, and compensation has to be made in the fifth year, the amount payable would be 100 × ·42857 = 42*l.* 17*s.* 1½*d.*

For an improvement in the	To find the unexhausted value, multiply the original ontlay by
1st year	1·
2nd „	·85714
3rd „	·71428
4th „	·57142
5th „	·42857
6th „	·28571
7th „	·14285

Improvements of the Third Class.

In order to obtain compensation in this class the improvement must have been made within two years.

The tenant is excluded in full from compensation for improvements of the third class in the following cases :—

'If he has taken from that portion of the holding on which the improvement has been made a corn, potato, hay, seed, or other exhausting crop :

'If either by agreement or custom of the country the tenant is entitled to and claims from the landlord or in-coming tenant a sum in respect of the additional value of any manure left on the holding from the consumption thereon, by cattle, sheep, or pigs, of cake or other feeding stuffs.'

And compensation is restricted under the following conditions:—

'If in the last year of his tenancy he has laid out in purchased manures and feeding stuffs more than he had laid out on an average of the last three preceding years, if the tenancy has lasted three years, or if not, for the number of years the tenancy has lasted, the extra amount laid out in the last year will not be considered in the claim for compensation.'

'If the tenant has sold off the holding, hay, straw, root, or green crops in the last two years of his tenancy, or, if his tenancy has not lasted two years, during his tenancy, unless he has brought back a proper quantity of manure to his holding from which such sale has been made, the value of the manure that such hay, straw, roots, or green crops would have produced will be deducted from the sum payable to him as compensation for any third class improvement.'

There are no rules laid down for finding the amount of compensation for an improvement in the third class. The valuer has, therefore, to take the period of two years, subject to the foregoing exclusions and restrictions, and then determine the scale of compensation according to the improvement.

In regard to manures applied directly to the land, the Act appears to include every description of manure, not omitting purchased dung, nitrate of soda, and the salts of ammonia and potash. There can, indeed, be no objection to admitting the purely nitrogenous manures as subjects of compensation, since the Act wholly excludes compensation where a corn, potato, hay, seed, or other exhausting crop has been taken after the improvement. This is probably the best arrangement that could be made. Mr. Lawes, it is true, considers that nitrate of soda and sulphate of ammonia have an unexhausted value of one-fifth their original cost, after growing both a root and a corn crop; but Dr. Voelcker, in his experiments with nitrate of soda on Lord Wenlock's estate, has found that when applied alone to land, it was exhausted in one season, and Mr. Lawes himself has several times pointed out the great difficulty of estimating the precise value of manure residue in the soil once it has grown a crop, and the uncertain action of different manures on different soils. The latter aspect of the question must never be lost sight of; and while we lay down a scale of compensation applicable to manures in the third class of the Act, it must be understood that the scale is merely an approximate estimate of the relative durable benefits of the different manures when applied under suitable conditions of soil and climate, and the allowances must therefore vary with varying conditions.

If the manure proves to have been of a suitable nature, and compensation can be claimed for the improvement, the following scale of allowances, in proportion to the original cost of the manure, may serve as a guide.

Table of Compensations for Unexhausted Purchased Manures applied, during the last two years, to land that has not since grown a Corn, Potato, Hay, Seed, or other Exhausting Crop.

Applied in	Dung	Guano	Dissolved bones[1]	Mineral superphosphate	Potash salts	Nitrate of soda	Sulphate of ammonia
Last year of tenancy .	$\frac{3}{5}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{4}$
Second last year of tenancy .	$\frac{2}{5}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	—	—	—

In determining the amount of compensation for unexhausted benefit from cake, corn, or other purchased feeding stuffs consumed on the land by cattle, sheep, or pigs, the allowance should not be based on the original cost of the food, but on the manurial value of a ton of such food. This is most important when we look at the manurial values of the different feeding stuffs (see page 64) as estimated by Mr. Lawes and Dr. Voelcker. On comparing the values they have given us with the mode which is often practically adopted of paying on one-third of the cost of the feeding stuff itself, it will be seen that the manurial value affords, on the whole, much the safest scale of compensation. Take a few examples :—

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[1] Undissolved bones being included in improvements of the second class.

Description of Food	Market price per ton of food			One-third of cost			Dr. Voelcker's estimate of manurial value		
	£	s.	d.	£	s.	d.	£	s.	d.
Cotton cake, decorticated	7	0	0	2	6	8	5	6	6
Linseed cake	10	0	0	3	6	8	3	15	8
Beans	9	10	0	3	3	4	3	2	0
Oats	10	0	0	3	6	8	1	15	0
Barley	7	0	0	2	6	8	1	5	0
Indian corn	6	0	0	2	0	0	1	5	0
Bran and pollard . . .	6	0	0	2	0	0	2	15	0

With one exception, viz., that of beans, the two scales are not at all approximate, one being sometimes much higher and sometimes much lower than the other. Most practical men, we believe, would sooner pay compensation for feeding stuffs on Dr. Voelcker's table of manurial values than pay on one-third of the cost of the food. They are then, at all events, certain that they are paying on something definite, which, except for cake, can seldom be the case when paying on one-third the cost of the feeding stuff.

Compensation for feeding stuffs is of course subject to the conditions already mentioned for improvements of the third class, and in any case the claim cannot extend beyond the two last years of the tenancy. The following scale of allowances, based on the manurial value of the food, will therefore fairly meet the case :—

Consumed by cattle, sheep, or pigs in the	Cake	Corn	Other feeding stuffs
Last year of tenancy	1	1	1
Second last year of tenancy . .	⅓	¼	⅕

In connection with this subject we may here introduce Mr. Lawes' table of unexhausted manure values, although it does not apply to compensation under the Agricultural Holdings Act (England) 1875. It is as follows:—

ESTIMATED MONEY VALUE OF THE UNEXHAUSTED RESIDUE OF MANURES REMAINING AFTER THE GROWTH OF DIFFERENT CROPS, EXPRESSED IN SHILLINGS, FOR EVERY 20*s.* ORIGINAL MANURE VALUE OF THE PURCHASED FEEDING-STUFF OR MANURE EMPLOYED.

After		Purchased or saleable food	Dung	Rape cake as manure	Bones	Nitrate of soda	Sulphate of ammonia	Guano	Compound artificial or refuse manures	Mineral superphosphates
PURCHASED (OR SALEABLE) FEEDING STUFFS CONSUMED WITH ROOTS, OR MANURE APPLIED FOR ROOTS.										
1st year	Food consumed with roots on land . . .	17								
	Food consumed with roots in yards . . .	16								
	Manure applied to roots consumed on land	—	17	16	17	15	15	15	12	9
	Manure applied to roots consumed in yards . .	—	16	15	16	14	14	14	10	8
2nd year	Corn crop, grain sold straw left	7	9	7	8	4	4	4	2	2
3rd ,,	Do. do. . . .	1	3	1	2	1	1	1	0	0
3rd ,,	Grass or hay consumed	2	5	3	4	2	2	2	0	0
4th ,,	Do. do.	0	2	0	1	0	0	0	0	0
3rd ,,	Hay sold	0	2	0	1	0	0	0	0	0
MANURE APPLIED FOR A CORN CROP.										
1st year	Corn crop, grain sold, straw left . . .	—	12	7	—	6	6	6	6	5
2nd ,,	Do. do.	—	6	1	—	0	0	0	0	0
2nd ,,	Grass or hay consumed	—	8	3	—	1	1	1	1	0
3rd ,,	Do. do.	—	4	1	—	0	0	0	0	0
2nd ,,	Hay sold	—	4	0	—	0	0	0	0	0
FEEDING STUFF CONSUMED ON, OR MANURE APPLIED TO, GRASS LAND—GRAZED										
1st year	Grazed	18	18	—	18	16	16	16	14	12
2nd ,,	,, ...	12	14	—	13	10	10	10	6	4
3rd ,,	,, ...	4	8	—	6	2	2	2	0	0
4th ,,	,, ...	0	2	—	1	0	0	0	0	0

After		Purchased or saleable food	Dung	Rape cake as manure	Bones	Nitrate of soda	Sulphate of ammonia	Guano	Compound artificial or refuse manures	Mineral superphosphates
FEEDING STUFF CONSUMED ON, OR MANURE APPLIED TO, GRASS LAND—HAY CONSUMED.										
—	No crop	18	0	—	0	0	0	0	0	0
1st year	Hay consumed . . .	11	16	—	16	14	14	14	13	10
2nd ,,	,, . . .	2	12	—	10	8	8	8	4	2
3rd ,,	,, . . .	0	6	—	3	1	1	1	0	0
4th ,,	,, . . .	0	0	—	0	0	0	0	0	0
FEEDING STUFF CONSUMED ON, OR MANURE APPLIED TO, GRASS LAND—HAY SOLD.										
—	No crop	18	0	—	0	—	—	—	—	—
1st year	Hay sold	2	10	—	10	—	—	—	—	—
2nd ,,	,, ...	0	4	—	4	—	—	—	—	—
3rd ,,	,, ...	0	0	—	0	—	—	—	—	—

CHAPTER VIII.

VALUATION OF DETERIORATIONS AND DILAPIDATIONS.

The subjects of compensation under this head include (1) any *deterioration of the soil* due to defective husbandry—tillage, cropping, or manuring; and (2) any *dilapidation of structures*—buildings, drains, roads, fences, and gates, &c.

The full value of landed property can only be obtained by keeping it in good order, and the landlord who lets his farm to another very naturally expects that not only the land but the structures upon it shall be delivered up to him, at the end of the lease, in as good a condition as is consistent with proper use and the wear and decay produced by time. Where the tenant fails to maintain or to leave the farm in this condition he is liable to pay to the landlord or the incoming tenant, as the case may be, a sum sufficient to make good the deterioration or dilapidation, or the difference between the value of the subject as it is and as it ought to be.

In determining the amount of compensation in respect of deteriorations or dilapidations of a holding, there should be taken into consideration the condition of the subject in respect of which the claim is made when it was handed over to the tenant, and due allowance made for fair use and natural decay and change. The condition of the subject at the beginning of a lease, cannot, however, always be so easily decided at the end of the lease, especially if it was a long one. It is better in such cases to take ordinary good usage and condition as the guide on this point; and if a tenant took to a farm when it was out of this condition, it must be presumed that he either received a money consideration paid down, or an easement in the rent in consideration thereof, to enable him to put it into the proper condition.

Deterioration of the soil due to bad husbandry may arise (1) from defective tillage, (2) from defective manuring, or (3) from over-cropping or mis-cropping.

There are cases where the tillage has been so defective that there is no dispute about it, and it is merely a question of valuing the amount of compensation which has to be awarded. It is not so much the ultimate deterioration of the soil, which in most cases of this kind would be nothing at all, but it is the fitness of the land for present farming, and the time and expense that may be required to clean and bring it again into a fit state of cultivation, that has to be looked at. Where the tillage has been so neglected that the land is thoroughly dirty and over-run with couch-grass, it takes a considerable time, perhaps some years, and a considerable outlay besides to get it perfectly clean again. If it is done in less time, it is done at a greater immediate expense. The valuer has to take both these points—time and outlay—into his calculations, which will be further regulated by the amount of labour which requires to be expended and the rate of wages in the district; but he has also to consider the diminution of produce on the land during the period of restoration, so far as such diminution may be caused by the defectiveness of former tillages. The clause usually inserted in farm leases, which binds the tenant to have the farm 'worked at all times in a husband-like manner,' embodies nothing more than the common law; but it doubtless includes an obligation to leave the farm as clear and free from weeds as good husbandry can make it. At the same time a field will now and then be found in a dirty condition when it cannot be said to be due to the tenant not working the land in a husband-like manner, especially if it can be shown that the season was a very bad one for weeds, and that the tenant expended more than the usual amount of labour in keeping the weeds down. This is a very different thing from a farm altogether in a bad state of tillage, and which has been habitually so throughout the lease or the latter part of it, and a distinction should be drawn accordingly.

It generally happens that where the tillage has been defective there has also been a want of manuring, and the circumstances are greatly aggravated when the land is poor as well as dirty and untilled. The cost of bringing round the land is, then, very much greater, and so is the time required to do it in. If there has been any deficiency in manuring from not bringing lime or manures on to the farm in implement of obligations incurred under the lease by the sale of hay, straw, or roots, that will of course form a separate consideration over and above that which is implied in bad husbandry from defective manuring.

It does not follow that where there is a change made in the crops that there is actual damage done. A crop of oats, for example, may be taken instead of wheat, when the subsequent crop is to be a root, or green crop, and the damage would be nothing, because oats, if anything, are rather the less exhausting crop of the two, and a root, or green crop, can follow the one corn crop as well as the other. Yet if it appeared that the lease on that point had a different meaning, and that not merely a corn crop was to be taken, but none other than a wheat crop, the tenant would be liable for non-fulfilment of contract. If there is any question of injury to the farm, such as taking more than one white crop in succession, or leaving too small a proportion of the land in grass, or too little land for roots, there would then be actual damage to consider, in addition to any penalty that might attach to non-compliance with the terms of the lease.

The *outfalls of the drains* must be left clear and open, and in an acting state. It cannot be too well known that where this is required in terms of the lease, the outgoing tenant is actionable for any loss that may arise to a crop on the land through his neglect to keep the drains clear. This is a small matter, however, with covered drains, where the outfalls are the chief points of attention; but there is just so much the less excuse for not leaving them as they ought to be. With open drains on pasture or hill lands—sheep drains, as they are usually termed on grazings—the case is different, and the whole drain must be left open and clear, and not merely the outfall. Where this is not done, it generally amounts to opening the drains anew, or taking another spade depth out of them, which can be done at just about the original cost of the drain, or something like 1*d.* per rod or pole.

Buildings, roads, fences, and gates.—Dilapidations on these are valued at what it will cost to put them into repair, having regard to the original *class* and *material* of the structure, and making the necessary allowance for natural wear and decay.

CHAPTER IX.

VALUATION OF STOCK-IN-TRADE.

At the close of the agricultural year, every farmer who desires to know exactly how his business stands and prospers, makes a valuation of the live stock, crops, implements, and other effects which form his stock-in-trade. A system of regular stock-taking every year obviates all the endless confusion which is apt to ensue without it. It not only affords the farmer a correct knowledge of his financial position, but it sharpens his judgment as to the value of the different articles with which he has to do, and without it he can never tell for certain what are the weakest and the strongest points in his system of management.

The best time for such a valuation depends very much on the kind of farm. On sheep farms or grazings the most suitable time is at Michaelmas or Martinmas, after the autumn sales, when the flock is made up for the winter, and there is no surplus stock to bring into the valuation. On arable farms there is no such suitable period, as the land is either covered with crops, or else the crops are in bulk and unrealised; but either the autumn term, as in the case of grazings, or the end of December is best. Some prefer to make the valuation on a corn farm at midsummer, but the crops are unmatured then, or still to be harvested, and an estimate at that time is less certain than in dealing with the bulk after harvest.

Those who object to the valuation of farm produce in this way as being a mere estimate, forget that they estimate the value of crops and of stock every time they go to market, both in buying and selling. How else do they ask or bid a price? The markets are a standard and guide of course, but they are just as good a guide to the farmer in valuing his stock-in-trade for his own satisfaction as when he takes it to market, if he chooses to bring himself as keenly to the question. Prices often vary in the interval, it is true; yet if the farmer knows when to sell, and sells at the right time, and takes care to value himself in at fair market rates, the fluctuation of prices should not affect his estimates very much, if at all. The valuation must be made with judgment, however, and if he is not a judge of the weight and value of everything he has to deal with on the farm, the sooner he becomes one the better. A wavering kind of judgment is not of much use in the matter, but the practice which he may obtain for himself in these annual valuations will, if he can benefit by it, give him both accuracy and confidence in his judgment.

A valuation of this kind, on an arable farm, includes the implements, harness, machinery, and fixtures; the horses, cattle, sheep, pigs, and poultry; the corn (threshed and unthreshed), hay, straw, root, and green crops; the purchased feeding stuffs on hand; the manures on hand, or applied to next year's crops; the seeds on hand or sown; the tillages performed on account of next year's crops; and the outstanding debts and credits of the farm.

The mode of valuing most of these subjects has been explained in previous chapters, but two or three remain to be noticed.

The implements, harness, machinery, and fixtures are only valued the first year to begin with, or taken at cost price, and 5 per cent. annually deducted from that value to make up for depreciation. The same principle is sometimes applied in taking stock-value of the farm horses, but, as we think, wrongly. A horse often improves in value for some years after it is put to work, and the price of horses is always varying, therefore they should be re-valued every year, according to the market rates, the same as store stock of every description.

Fat animals are valued at their weight, taken at the market price. The weight may be found by actual weighing, or by measurement. To find the carcass weight by measurement,—multiply the square of the girth by the length, and this product by the decimal ·254, which will give the weight of the four quarters in imperial stones. Thus, if an average fat bullock measure seven feet in girth, and five feet in length, the carcass weight would be $7^2 = 49 \times 5 = 245 \times {\cdot}254 = 62{\cdot}230$ imperial stones. If the same animal, instead of being measured, was weighed alive, and stood 102·70 imperial stones, then, to find the dead weight, multiply the live weight by the decimal ·605, which in the above case gives the weight of the four quarters thus: $102{\cdot}70 \times {\cdot}605 = 62{\cdot}133$ imperial stones. The result of the two methods by these rules gives very nearly the same proportion of carcass weight, being a little over 60 per cent. This proportion we find to be pretty near the average run of moderately fat sheep and bullocks. Fat pigs give a higher proportion, as much as 80 per cent., and upwards. The rule of *eight-fourteenths* is a little below the above, and is more at fault in calculating the weight of exceptionally fat and heavy animals, but it is nearer to that of middling and half-fat beasts. The old rule of one-half is very much too low for improved breeds, although it is still the custom in some parts of the country, when selling sheep or cattle on the proportion of dead to live weight, to reckon on 'sinking the half.'

Unthreshed corn can be estimated to the nearness of a quarter by an observant farmer, who knows the size of his corn stacks, the roughness of the straw, and the grain-yielding character of the different fields. At times he may find the rule we have given under the head of straw, for finding the relative weights of grain and straw, of some help to him here. Grain in heap is generally known to a bushel, but there is a ready method of finding the quantity of grain in any heap or bin, when it is required, without going to the labour of measuring it up bushel by bushel. The capacity of the imperial bushel measure is 2218·192 cubic inches; so that the number of bushels in any corn heap or bin can at once be found by dividing the number of cubic inches in the heap or bin by 2218·192.

The inventory and valuation may be made out in the following form:—

WOODLAND FARM.

Valuation, December 31, 1877.

Implements, &c., on hand, as follows:

(Valuation 1876 less 5 per cent. in 1877.)

	1876			1877		
	£	s.	d.	£	s.	d.
4 iron ploughs	16	0	0	15	4	0
1 double subsoil plough	5	10	0	5	4	6
2 ,, mouldboard ploughs	7	10	0	7	2	6
2 cultivators	18	0	0	17	2	0
1 general drill	30	0	0	28	10	0
2 drill grubbers	6	0	0	5	14	0
4 sets iron barrows	15	10	0	14	14	6
1 Cambridge roller	10	0	0	9	10	0
1 iron roller	6	0	0	5	14	0
1 horse rake	5	0	0	4	15	0
1 hay-maker	12	0	0	11	8	0
2 self-delivery reapers	56	0	0	53	4	0
1 mower	15	0	0	14	5	0
8 carts	80	0	0	76	0	0
1 water-cart	5	0	0	4	15	0
8 sets cart and plough harness	32	0	0	30	8	0
Carry forward	319	10	0	303	10	6

	1876			1877		
	£	s.	d.	£	s.	d.
Brought forward	319	10	0	303	10	6
1 rick-cloth and poles	10	0	0	9	10	0
4 cart-cloths	4	0	0	3	16	0
100 corn-sacks	12	10	0	11	17	6
1 sack-barrow	1	0	0	0	19	0
1 winnowing machine	5	0	0	4	15	0
1 threshing-machine	60	0	0	57	0	0
1 engine, 6 h.-p.	75	0	0	71	5	0
1 cake-crusher	5	0	0	4	15	0
1 corn-bruiser	5	0	0	4	15	0
1 root-pulper	5	0	0	4	15	0
1 chaff-cutter	8	0	0	7	12	0
2 wheelbarrows	1	10	0	1	8	6
3 ladders, 10 ft., 20 ft., and 30 ft.	2	10	0	2	7	6
20 sheep-troughs	3	0	0	2	17	0
20 feeding-pans	4	0	0	3	16	0
10 iron cribs	10	0	0	9	10	0
40 chain-ties for cattle	2	0	0	1	18	0
8 pitch-forks	0	10	0	0	9	6
8 dung-forks	0	15	0	0	14	3
6 shovels	0	15	0	0	14	3
1 barn-shovel	0	4	3	0	4	0
1 bushel measure	0	11	0	0	10	4
2 drag rakes	0	10	0	0	9	6
12 small rakes	0	15	0	0	14	3
1 iron stake pitcher	0	5	0	0	4	9
12 dozen sheep-hurdles	12	0	0	11	8	0
20 ,, ,, wattles	7	0	0	6	13	0
2 hay knives	0	5	0	0	4	9
6 water-buckets	0	10	0	0	9	6
4 corn-bins	2	0	0	1	18	0
1 gallon measure	0	1	6	0	1	5
2 stable lamps	0	5	0	0	4	9
2 stone hammers	0	3	0	0	2	10
2 pickaxes	0	5	0	0	4	9
2 seed-baskets	0	10	0	0	9	6
1 hedge hill	0	5	0	0	4	9
1 set of carpenter's tools	1	10	0	1	8	6
1 measuring-chain and poles	0	10	0	0	9	6
Carry forward {Total value of implements}	562	9	9	534	7	1

		1876 £	s.	d.	1877 £	s.	d.
Brought forward		562	9	9	534	7	1
Horses on hand December 31, 1876–7		420	0	0	400	0	0
In 1877 as follows :—	£						
1 grey horse, 6 years	50						
1 ,, ,, 7 ,,	55						
1 brown mare, 9 years	50						
1 ,, ,, 8 ,,	60						
1 black mare, 6 ,,	60						
1 ,, horse, 6 ,,	50						
1 brown mare, 9 years	40						
1 ,, horse, 10 years	35						
	400						
Cattle on hand December 31, 1876–7		860	0	0	950	0	0
In 1877 as follows :—							
1 shorthorn bull	30						
10 milk cows	200						
20 yearlings	200						
20 fatting beasts	500						
10 calves	20						
	950						
Sheep on hand Dec. 31, 1876–7.		2,645	0	0	2,700	0	0
In 1877 as follows :—							
600 ewes	1,500						
400 fatting sheep	1,200						
	2,700						
Pigs on hand Dec. 31, 1876–7		98	0	0	87	0	0
In 1877 as follows :—							
6 brood sows	30						
30 shotts	30						
12 porkers	24						
1 boar	3						
	87						
Poultry on hand Dec. 31, 1876–7		3	2	0	4	12	6
Farm produce on hand Dec. 31, 1876–7		2,304	0	0	2,230	0	0
In 1877 as follows :—							
50 tons meadow hay, at 84*s.*	210						
100 ,, wheat straw, at 16*s.*	80						
Carry forward	290	4892	11	9	4905	19	7

				1876			1877		
	£			£	s.	d.	£	s.	d.
Brought forward . .	290			4892	11	9	4905	19	7
75 tons oat straw, at 21*s.* 4*d.* . .	80								
333⅓ quarters wheat, at 45*s.* . .	750								
200 quarters oats, at 28*s.* . . .	280								
15 acres mangold wurzel, at 12*l.* .	180								
25 „ swedes, at 10*l.* . . .	250								
35 „ turnips, at 8*l.* . . .	280								
10 „ cabbage, at 12*l.* . . .	120								
	2,230								
Purchased feeding stuffs on hand, Dec. 31, 1876–7				26	0	0	30	0	0
In 1877 as follows :—	£	*s.*	*d.*						
1 ton linseed cake . . .	10	0	0						
1 „ pollard	6	0	0						
2 „ cotton cake . . .	14	0	0						
	30	0	0						
Manures on hand or applied, Dec. 31, 1876–7				142	0	0	137	10	0
In 1877 as follows :—									
5 tons superphosphate . .	25	0	0						
2 „ Peruvian guano . .	24	10	0						
440 cub. yards dung, at 4*s.* .	88	0	0						
	137	10	0						
Crops sown at Dec. 31, 1876–7 .				88	10	0	90	19	0
In 1877 as follows :—									
25 qrs. seed-wheat (100 acres) .	70	0	0						
12 bushels trifolium (6 acres) .	2	4	0						
20 „ winter vetches (10 acres)	10	0	0						
50,000 cabbage-plants and planting, at 3*s.* 6*d.* per thousand (10 acres)	8	15	0						
	90	19	0						
Tillages done before Jan. 1, 1877–8				120	0	0	123	8	0
In 1877 as follows :—									
100 acres ploughing, harrowing, and seeding with wheat, at 12*s.*	60	0	0						
Carry forward .				5269	1	9	5287	16	7

							1876			1877		
				£	s.	d.	£	s.	d.	£	s.	d.
Brought forward				60	0	0	5269	1	9	5287	16	7
6 acres cultivating and rolling-in trifolium, at 5s.				1	10	0						
20 acres ploughing and harrowing for vetches, at 10s.				10	0	0						
10 acres ploughing and harrowing for cabbages, at 10s.				5	0	0						
117¼ acres stubble-ploughing, at 8s.				46	18	0						
				123	8	0						
Cash standing to farm account on Dec. 31, 1876–7							120	0	0	571	0	0
Total value of property on hand Dec. 31, 1876–7							7,389	1	9	7,858	16	7
Outstanding debts Dec. 31, 1876–7 (to be added)							39	0	0	46	0	0
In 1877 as follows:—												
Due to the Farm—M. Williams, for 30 fat sheep				90	0	0						
Due by the Farm				44	0	0						
	£	s.	d.									
Saddler's account	4	17	6									
Blacksmith's do.	5	0	10									
Carpenter's do.	3	0	0									
Cake and manure merchant	31	1	8									
	44	0	0									
Difference, to be added				46	0	0						
Total value of stocks on hand, Dec. 31, 1876–7							7,428	1	9	7,904	16	7

The usual method of finding the net annual profit or loss on the farm is to put on one side all the expenses, which include rent, rates and taxes, wages, purchased manures and seeds, and feeding stuffs, interest on capital, wear and tear and depreciation, and the valuation of stock at the beginning of the year; on the other side, the value of all the produce and stock disposed of, and the new valuation of stock on hand. Interest is charged on the dead stock and the working cattle, and also on the cost of producing the crops, but not on the articles after they are produced.

But the result may be ascertained far more readily, and just as accurately, from the foregoing inventory and valuation, as will be apparent from the following:—

FARM BALANCE SHEET, DEC. 31, 1877.

Inventory	*Debtor* for the following, as per valuation Dec. 31, 1876, and chargeable against the year ending Dec. 31, 1877			*Creditor* by valuation of property at this date, Dec. 31, 1877		
	£	s.	d.	£	s.	d.
Implements, &c.	562	9	9	534	7	1
Horses	420	0	0	400	0	0
Cattle	860	0	0	950	0	0
Sheep	2,645	0	0	2,700	0	0
Pigs	98	0	0	87	0	0
Poultry	3	2	0	4	12	6
Farm produce	2,304	0	0	2,230	0	0
Purchased feeding-stuffs	26	0	0	30	0	0
Manures	142	0	0	137	10	0
Crops sown	88	10	0	90	19	0
Tillages	120	0	0	123	8	0
Cash standing to Farm account	120	0	0	571	0	0
Outstanding debts	39	0	0	46	0	0
	7,428	1	9	7,904	16	7
Balance—being net profit	476	14	10			

This gives the net profit on the farm, and also the original and present values of the different items of stock. It does not, however, show how the profit was made, or on what it was made. That necessary item of intelligence must be gathered from the journal and ledger accounts of the different branches.

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